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THE
EDINBURGH
NEW DISPENSATORY:

CONTAINING

I. The ELEMENTS of PHARMACEUTICAL CHEMISTRY.
II. The MATERIA MEDICA; or The NATURAL, PHARMACEUTICAL, and MEDICAL HISTORY, of the SUBSTANCES EMPLOYED in MEDICINE.
III. The PHARMACEUTICAL PREPARATIONS and COMPOSITIONS.

INCLUDING

Translations of the London Pharmacopœia, published in 1809; of the Edinburgh Pharmacopœia, in 1805; and of the Dublin Pharmacopœia, in 1807.

Illustrated and explained in the Language, and according to the Principles, of MODERN CHEMISTRY.

With many NEW and USEFUL TABLES; and
Several Copperplates of Chemical Characters and Pharmaceutical Apparatus.

By ANDREW DUNCAN, Jun. M. D.

Regius Professor of Medical Jurisprudence in the University of Edinburgh, Fellow of the Royal College of Physicians and Royal Society of Edinburgh, and Associate of the Linnean Society of London.

FIFTH EDITION,

CORRECTED AND ENLARGED.

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TO

ANDREW DUNCAN, M. D.

PROFESSOR OF THE INSTITUTIONS OF MEDICINE

IN THE

UNIVERSITY OF EDINBURGH,

THIS WORK

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PREFACE.

DR. LEWIS published the first edition of his *New Dispensatory* in 1754. The principal part of this work was a commentary upon the London and Edinburgh Pharmacopœias, of both of which it contained a complete and accurate translation. A concise system of the Theory and Practice of Pharmacy was prefixed as an introduction; and directions for extemporaneous prescription, with many elegant examples, and a collection of efficacious, but cheap remedies, for the use of the poor, were added as an appendix.

The manner in which the whole was executed, placed DR. LEWIS at the head of the reformers of Chemical Pharmacy; for he contributed more than any of his predecessors to improve that science, both by the judicious criticism with which he combated the erroneous opinions then prevalent, and by the actual and important additions he made to that branch of our knowledge. He was justly rewarded by the decided approbation of the public. During his lifetime many editions were published, each succeeding one receiving the improvements which the advancement of the sciences connected with Pharmacy suggested.

After the death of DR. LEWIS, DR. WEBSTER and DR. DUNCAN, senior, successively contributed to maintain the reputation of the work, by taking advantage of the discoveries made in natural history and chemistry, and by making those alterations which new editions of the Pharmacopœias on which it was founded rendered necessary. From the place of their publication, and to distinguish them from the original work of DR. LEWIS, which was still reprinted, without alteration, in London, these improved editions were entitled *The EDINBURGH New Dispensatory.*

When the Edinburgh College were preparing to publish the last edition of the Pharmacopœia, the booksellers who purchased the copy-right of that work were desirous that it should be accompanied by a corresponding Dispensatory. Indeed, since the year 1788, when my father revised it, it had undergone no material alteration, although it has been often reprinted with the name of another editor. During that period, the progress of chemistry, pharmacy, and natural history, has been so great, as to render a complete reform absolutely necessary.

This, to the best of my abilities, I attempted in the first edition, which I published in 1803, and, if I may judge from the sale of the work, not altogether unsuccessfully. For, although the impression was very large, in the course of six years, it underwent four editions, and is now published for the fifth time. These frequent editions have enabled me, on the one hand, to prevent the work from ever falling very materially behind the state of the science; but, on the other hand, the very short time allowed me to prepare each for the press, compared with the size of the volume, and the multiplicity of objects to be attended to in it, have hitherto prevented me from giving it that degree of perfection, which I have always wished to do. No person can be more sensible of the numerous deficiencies in it, than I am, but I must have either permitted the work to be republished without alteration, or superintended the publication myself, with such improvements as I was able to make upon it. In choosing the latter alternative, I consulted the interest of my readers, perhaps, more than my own reputation. Aspiring to no higher merit than that of being an industrious compiler, I am conscious that I must appear ignorant, nay, that I really am ignorant, of many things that I ought to know; but I may be permitted to plead as my apology, the great extent of the subject, the variety of sciences with which it is connected, the rapid progress they are making, and the immense number of publications in which the necessary information is dispersed On most occasions I have had recourse to original sources f information; but I have sometimes borrowed from other compilers, like myself; but I have always taken care to be assured of their accuracy. This liberty, however, I have only taken, when it would have been affectation to have pretended to avoid it, and I have generally acknowledged the source from which I have received such assistance, and have sometimes made considerable alterations and additions. I may also, as a proof of my anxiety to render this work worthy of the favourable reception with which it has met, advert to the numerous experiments which I have made, either to settle points upon which the best authorities were at variance, or to investigate substances which were imperfectly understood.

In all the editions the plan and arrangement adopted by Dr. LEWIS has been followed. The work is divided into three parts. The first contains Elements of Pharmacy; the second, the Materia Medica; and the last, the Preparations and Compositions

The *first* of these is entirely new, nothing being retained but the title. It is divided into two sections. The first contains a very concise account of some of the general doctrines of *Chemistry*, and of the properties of all simple bodies, and the generic characters of compound bodies. In the second part, the *Operations of Pharmacy*, and the necessary apparatus, are described: and an Appendix is added, containing many very useful tables, and the explanation of the plates.

The *second* and *third parts* contain translations of the Pharmacopœias of the colleges of Edinburgh, Dublin, and London; with a commentary, more or less full, as the nature of the article seemed to require. The text, in consequence of the new edition of the London Pharmacopœia, has now become entirely new, that of the Dublin college having been first added by myself, and the numerous alterations introduced by the last edition of the Edinburgh college, having been the cause of my engaging in this work. In the dictionary of *Materia Medica*, I have adopted the nomenclature of the Edinburgh college, or rather of natural history, in preference to the officinal names hitherto employed. To the systematic name of each article are subjoined its synonimes in the different Pharmacopœias, and the designations of the parts used in medicine; then the class and order of natural bodies to which it belongs; and if a vegetable, the exact number of its genus and species, according to the excellent edition of LINNÆUS's *Species Plantarum*, now publishing at Berlin by Professor WILLDENOW.

In consequence of some sheets of this edition having been printed off before the New London Pharmacopœia was published it becomes necessary to insert, in this place, the principal alterations to be made in these sheets, in order to accommodate them to the improvements made by the Royal College in their Dispensatory.

So far as these consist in changes of nomenclature, it is sufficient to refer to the very copious table of synonimes inserted in the Appendix to the third part, in which all these changes are inserted.

In regard to the articles contained in the former Pharmacopœias, but rejected from the present, very little, if indeed any, disadvantage arises. They are few in number; and some account of articles so lately in use may be still acceptable to many readers.

It, therefore, only remains to notice the additional information given by the London College, with regard to those articles of the Materia Medica contained in the sheets of the Dispensatory thrown off, before the publication of the College appeared, and to describe the substances added by it to the list of British officinals.

Aloë Spicatus and *Vulgaris*.—The London College now agree with that of Dublin, and with Thunberg, in indicating the *Aloe spicatus* as the species which produces the Socotorine aloes; and they indicate, as the source of the Barbadoes aloes, a species to be described, under the name of *Aloë vulgaris*, by the late Dr. Sibthorpe, in his great work, the Flora Græca, now preparing for publication by Dr. Smith, who informed Dr. Powell, the authorised translator and commentator of the London Pharmacopœia, "that the plant described, under the above name, is asserted by Dr. Sibthorpe to be the true *Aloë* of Dioscorides, which is described as producing our Officinal Barbadoes aloes by Sloane, in his History of Jamaica."

I may take this opportunity of correcting a series of typographical blunders in page 160. According to the analysis of Aloes by Newmann, 1000 parts contain 8 soluble in water only, or, analogous to gum; 93 in alcohol only, or resinous; 845 in water, and in alcohol, or extractive; and 54 soluble in neither of these menstrua.

Ammoniacum.—Gum ammoniac is now referred, on the authority of Willdenow, to the *Heracleum gummiferum*, which he raised from seeds taken out of the Ammoniacum of the shops; and which, he is satisfied, is the plant which yields it, although he has not been able to procure it from the plants raised at Berlin. I regret that I have not been able to see the *Flora Berolinensis*, in which this plant is described, as the question might be decided, with great certainty, by comparing it with the figure, unfortunately not the drawing of a botanist, though sufficiently characteristic, published in his account of the empire of Morocco, by Mr. Jackson, who was perfectly familiar with it. He gives the following account of it: "*Ammoniacum*, called *Feshook* in Arabic, is produced from a plant similar to the European fennel, but much larger. In most of the plains of the interior, and particularly about El Araiche and M'sharrah Rummillah, it grows ten feet high. The Gum ammoniac is procured by incisions in the branches, which, when pricked, emit a lacteous glutinous juice, which being hardened by the heat of the sun, falls on the ground, and mixes with the red earth below; hence the reason that Gum ammoniac of Barbary does not suit the London market. It might, however, with a little trouble, be procured perfectly pure; but when a prejudice is once established against any particular article, it is difficult to efface it. The gum, in the above mentioned state, is used in all parts of the country, for cataplasms and fumigations. The sandy light soil which produces the gum ammoniac, abounds in the north of Morocco. It is remarkable, that neither bird nor beast is seen where this plant grows, the vulture only excepted. It is, however, attacked by a beetle, having a long horn proceeding from its nose, with which it perforates the plant, and makes the incisions whence the gum oozes out."

Zingiber Officinale.—In the botanical arrangement of the well-known plant which produces the Ginger, the London College have followed Mr. Roscoe of Liverpool, who has given a new classification of the Scitamineous plants in the eighth volume of the Linnæn Society, in which he has separated the Zingiber from the Cardamom. "It has been well remarked by Jussieu," says Mr. Roscoe, "that the *Zingibers* flower in a dense spike near to the stem; the *Cardamoms* in a lax panicle at the base of the stem. Such an uniform natural distinction in the habit of these plants, gave great reason to suppose that, by a closer examination, sufficient generic distinctions would be ascertained. This expectation has been fully confirmed. In the plants of the Ginger tribe, it appears that the anthera-bearing filament is extended beyond the anthera, and terminates in an awl-shaped appendage, with a groove or furrow to receive the style after it has passed between the lobes of the anthera, and which terminates with the stigma, a little beyond the extremity of the filament; but in the plants of the Cardamom, or proper amomum tribe, the anthera-bearing filament terminates in an appendage of three or more lobes, and differs also in other respects, as will be more particularly noticed under the genus *Amomum.*"

Elettaria Cardamomum.—"From an accurate description of the plant producing this valuable aromatic (Lesser cardamoms) communicated to the Linnæan Society by Mr. White, surgeon, Madras, (who, following the example of other botanical writers, improperly refers it to the genus *Amomum*) it has been thought necessary to place the Cardamom under a new genus, which Dr. Maton has named *Elettaria*, from the appellation of *Elettari*, originally given to this tribe by Van Rheede, in his *Florus Malabaricus.*"—Dr. Powell.

Cusparia Febrifuga.—It is under this name, we are informed by Dr. Powell, that M. M. Humboldt and Bonpland intend to describe the tree which produces the Angustura bark; and the name to be given to it by its discoverers will probably tained, in preference to that given by Willdenow, in honour of one of them, as mentioned in our observations on this article.

Astragalus Verus.—This is now stated, on the authority of Olivier, as the species which furnishes the chief part of the Gum tragacanth of commerce. His words are, "This gummy substance is formed from the month of July to the end of September, on the trunks of several species of Astragalus, which grow in Natolia, Armenia, Curdistun, and all the north of Persia. Tournefort has described one of these, which also furnishes Tragacanth, which he found on Mount Ida in Crete; and La Billardiere has described and figured another which he saw in Syria. The Astragalus, which appears to us the most common, and that from which almost all the Tragacanth of commerce is derived, has not been described by any botanist. It differs essentially from the two species which we have mentioned, in its habits and its flowers." In a note upon the description, which it is unnecessary to insert, he characterizes it as "*Astragalus verus*, fruticosus, foliolis villosis, setaceis, subulatis; floribus axillaribus, aggregatis, luteis." After finishing the description, he continues, "Tragacanth exudes naturally, either from wounds made in the shrub by animals, or from fissures occasioned by the force of the *succus proprius*, during the great heats of summer. According as the juice is more or less abundant, Tragacanth exudes in tortuous filaments, which sometimes assume the form of a small worm, or of a pretty thick worm, elongated, rounded, or compressed, rolled up upon itself, or twisted. It is the finest and purest Tragacanth which assumes this form. It is almost transparent, whitish, or of a yellowish white. It also exudes in large tears, which preserve more or less of the vermicular form. This is more of a reddish colour, and more contaminated with impurities. It sometimes adheres so strongly to the bark, as to bring part of it with it in gathering it. The quantity of tragacanth furnished by Persia is very considerable. Much is consumed in that country in the manufacture of silk, and the preparation of comfits. It is exported to India, Bagdad, and Bussorah. Russia also gets some by the way of Bakou."

Allium Porrum.—The common leek is rather an article of the Materia Alimentaria, than of the Materia Medica. In its properties, it is analagous to garlick, but weaker even than the common onion. A decoction of the beards or filaments of the bulbs is supposed by the vulgar to be lithontriptic. It is perhaps on the same belief that it is admitted by the London College.

Cerevisiae Fermentum.—Barm or yeast has lately been much extolled as an antiseptic remedy in putrid fevers. A table spoonful is recommended to be given as a dose in porter, or wine and water. It is also applied externally, in the form of a poultice, to foul and putrid sores.

Euphorbium, Gummi Resina.—The London College have restored this drastic and corrosive substance to their list of officinals. It is produced from several species of the African genus Euphorbium; such as the *E. officinarum* of the Cape of Good Hope, the *E. antiquorum* which grows in Egypt, Arabia, and the East Indies, and which is said to have furnished the Euphorbium of the ancients, aud the *E. Canariensis.* Mr. Jackson, in his account of Morocco, has described it, but unfortunately not in the language of science. *Furbiune,* he says, is the Arabic name of this gum, which is produced by a very curious succulent plant, growing on the Atlas mountains, and called by the Shellahs and Arabs *Dergmuse.* From the main body of the plant, proceed several solid leafless branches, about three inches in circumference and one in diameter, from the top of which shoot out similar ones, each bearing on its sumit a vivid crimson flower; these branches are scolloped, and have on their outer side small knots, from which grow five extremely sharp pointed thorns, about one third of an inch in length. The stalk is at first soft and succulent, but becomes hard in a few years, when the plant assumes the above mentioned form, and may then be considered as at its maturity. The inhabitants of the lower regions of Atlas, make incisions in the branches of the plant with a knife, from which a corrosive lactious juice issues, which, after being heated by the sun, becomes a substance of a whitish yellow colour, and in the month of September drops off, and forms the gum Euphorbium. The plants produce abundantly only once in four years; but this fourth year's produce is more than all Europe can consume; for, being a very powerful cathartic, it is there little used. The people who collect the gum are obliged to tie a cloth over their mouth and nostrils, to prevent the small dusty particles from annoying them, as they produce incessant sneezing. The branches are used in the tanning of Morocco leather, and it is in great request among the women, as a *depilatory*.

It is brought to us immediately from Barbary, in drops of an irregular form; some of which, on being broken, are found to contain little thorns, small twigs, flowers, and other vegetable matters; others are hollow, without any thing in their cavity; the tears, in general, are of a pale yellow colour externally, but somewhat white within; they break easily between the fingers. Euphorbium is extremely troublesome to pulverize; the finer part of the powder, which flies off, affecting the head in a violent manner. The acrimony of this substance is so great, as to render it unfit for internal use: It burns with an agreeable smell and a bright flame, and consists of nearly equal parts of gum and resin. When applied to the tongue, it seems at first to have no taste, but on being held some time in the mouth, it excites a very violent biting and burning; which lasts a long time, and cannot be abated by washing out the mouth.

A most important change has been made by the London college in regard to the measures to be used in pharmacy. After mentioning the difference between troy and averdupois weight, the college says, "There are also different measures for liquids, one being used for beer and another for wine. The last is that adopted by us, and we employ for liquids measures derived from the wine gallon."

" The wine gallon is fixed by law; for medical purposes we divide it in the following manner:

The gallon *(congius)*	contains	8 pints,	O
The pint *(octarius)*		16 fluidounces,	f℥
The fluidounce *(fluiduncia)*		8 fluidrachms,	fʒ
The fluidrachm *(fluidrachma)*		60 minims *(minima)*,	♏[*]

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[*] To prevent errors from the indiscriminate use of the same terms to express weights and measures, we have, upon mature consideration, invented

"We have added the characters by which the several measures are denoted."

"It must also be remarked, that dry substances are always prescribed by weight, and fluid by measure, unless it be otherwise expressed."

Table of Measures of the London College.

Gal.	Pints.	Fluidounces.	Fluidrachms.	Minims.	Troygrains.
1	8	128	1024	61.440	58.176
	1	16	128	7.680	7.272
		1	8	480	454.5
			1	60	56.8.

In a note upon the fourth page, I very inconsiderately promised to give, in the preface, a short and connected view of Mr. Davy's experiments, the most interesting to science which the ingenuity of any chemist has contrived, or his industry performed. The limits of a preface will only allow me to state the positive results in an aphoristic manner; and I must refer my readers, for a clear and ample detail of the whole, to the recent publication of Mr. Murray.

Potassium, the base of potass, is a white metal, brittle and crystallized at 32°; a soft and malleable solid at 50°, resembling polished silver; at 60° imperfectly fluid and mobile, very much resembling quicksilver; and at 100 perfectly so. At a red heat it is converted into vapour. It is the lightest liquid known, at 62°, being only as 6, water being 10. Exposed to the air, it attracts oxygen and becomes covered with crust of potass; when in a state of vapour, it burns with an intense heat, and a bright white light. It explodes and inflames with water, and even with ice. It burns in all the gases containing oxygen, and the mineral acids set fire to it. It is soluble in hydrogen gas, forming a compound which inflames with atmospheric air. It combines

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new terms, which a little habit will render familiar. Besides, we measure *minims* by means of a glass tube, divided into equal parts; for the measurement by drops is deceitful and uncertain, as it requires almost twice the number of drops of any tincture to fill any measure than it does of water."

with sulphur and phosphorus, and the metals, forming readily oxydizable compounds. Eighty-five parts of potassium, and 15 of oxygen form potass.

Sodium, the base of soda, resembles in its appearance silver. At 32° it is easily malleable, begins to lose its cohesion at 120°, and is perfectly fluid at 180°. It is not volatilized by the heat which melts plate glass. Its specific gravity is 0.9348, water being 1. It absorbs oxygen slowly from the atmosphere, and at a high temperature burns with bright sparks. It decomposes water with effervescence, and is inflamed by nitrous acid. It is not soluble in hydrogen. It combines with sulphur, phosphorus, and the metals. 78.5 of sodium with 21.5 oxygen form soda.

Mr. Davy has also obtained metallic bases from some of the earths, especially barytes and strontites, and *Berzelius* obtained an amalgam by galvanizing mercury in contact with a solution of ammonia.

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THE EDINBURGH

NEW DISPENSATORY.

PART I.

ELEMENTS OF PHARMACY.

1. THE object of Pharmacy is to provide those substances which may be employed for the prevention or cure of diseases.

2. To obtain this object completely, an acquaintance with the physical and chemical properties of bodies is necessary. This may be termed the Science of Pharmacy.

3. Few substances are found in nature in a state fit for their exhibition in medicine. The various preparations which they previously undergo constitute the Art of Pharmacy.

4. Pharmacy is so intimately connected with Chemistry, that the former can neither be understood as a science, nor practised with advantage as an art, without a constant reference to the principles of the latter. For this reason, it will be proper to premise such a view of the general doctrines of chemistry, and of the most remarkable properties of chemical agents, as is necessary for the purposes of pharmacy.

SECT. I.

EPITOME OF CHEMISTRY.

5. The most minute particles into which any substance can be divided, similar to each other, and to the substance of which they are parts, are termed its *Integrant particles*.

6. The most minute particles into which bodies can ultimately be divided are called their *Elementary particles*.

7. When the integrant particles admit of no further division, the body is a *Simple Substance.*

8. But the integrant particles of most bodies can be subdivided into other particles, differing in their nature from each other, and from the body of which they are parts. These bodies are called *Compound Bodies.*

9. If the particles, of which the integrant particles of any compound body are composed,

- *a.* admit of no further division, the body is a *Primary Compound;*
- *b.* but if they be also compound, and admit of still further subdivision, they are called *Intermediate particles*, and the body is a *Secondary Compound.*

10. Therefore the integrant particles

- *a.* of simple substances are also their elementary particles;
- *b.* of primary compounds are composed of elementary particles;
- *c.* of secondary compounds are composed of intermediate particles.

11. The phenomena of matter are regulated by attraction and repulsion.

ATTRACTION.

12. *Attraction* comprehends those forces which cause bodies to approach towards each other.

13. It operates

- *a.* at sensible distances, as in the attractions of *gravity*, *electricity*, and *magnetism;*
- *b.* at insensible distances; *Contiguous attraction*
  - *a. a.* between particles of the *same* species, constituting the attraction of *cohesion* or *aggregation;*
  - *b. b.* between particles of *different* species, the attraction of *composition* or *affinity.*

REPULSION.

14. *Repulsion* tends to separate bodies from each other.

15. It also operates either

- *a.* at sensible distances, as in the repulsion of *electricity* and *magnetism;* or
- *b.* at insensible distances, as in the repulsion of the matter of heat or caloric.

16. The phenomena resulting from the operation of the second class of attractions (13. *b*), and second class of repulsions (15. *b*), constitute the proper objects of chemistry.

AGGREGATION.

17. Bodies exist under different forms of aggregation:
   - *a.* Solid, in which the attraction of cohesion resists relative motion among the particles, either
      - *a. a.* perfectly, as in hard bodies; or
      - *b. b.* imperfectly, as in soft, malleable, ductile, and elastic bodies.
   - *b.* Fluid, in which it admits of relative motion among the particles, either with facility, as in perfect fluids; or difficultly, as in viscid fluids.
   - *c.* Gaseous, in which the particles repel each other.

AFFINITY.

18. Affinity is regulated by the following laws:
   - *a.* It does not act at sensible distances.
   - *b.* It is exerted only between particles of different species.
   - *c.* It is exerted by different bodies, with different degrees of force.
   - *d.* It is the inverse *ratio* of saturation.
   - *e.* It increases with the mass; that is, it acts in the ratio of the affinity and quantity of any body.
   - *f.* Its action is influenced by cohesion, specific gravity, elasticity, and temperature.
   - *g.* It is often accompanied by a change of temperature.
   - *h.* Substances, chemically combined, acquire new properties;
   - *i.* And cannot be separated by mechanical means.
   - *k.* The action produced by different affinities, existing in one substance, is called *Resulting Affinity.*

19. Affinity is
   - *a. simple,* when two bodies unite, in consequence of their mutual attraction alone, whether these bodies be themselves simple or compound, and even although, in the latter case, it be attended with decomposition.
   - *b. compound,* when there is more than one new combination, and when the new arrangement would not have taken place, in consequence of the attractions tending to produce either combination singly.
   - *c. disposing,* when bodies, which apparently have no tendency to unite, combine, in consequence of the addition of another body, which has a strong affinity for the compound.

When the science of chemistry comes to be better understood, all the cases at present referred to this last species of affinity, will probably be found to belong to one of the preceding: for it is absurd to suppose, that a body can possess affinities before it is formed.

20 The attractions which tend to preserve the original arrangement of bodies presented to each other, are denominated *Quieſcent attractions;* those which tend to destroy the original, and to form a new arrangement, are termed *Divellent attractions.*

21. It is evident, that no new arrangement can take place, unless the divellent be more powerful than the quiescent attractions.

CLASSIFICATION OF ELEMENTARY OR UNDECOMPOSED SUBSTANCES.

22. Simple substances:

A. Imponderable,	Light.
	Caloric.
	Electricity.
	Magnetism.
B. Gravitating substances:	
a. Capable of supporting combustion,	Oxygen.
b. Oxygenizable,	
1. Incombustible,	Nitrogen.
	Muriatic acid.
2. Combustible,	Hydrogen.
	Carbon.
	Sulphur.
	Phosphorus.
	Metals.
c. Having no affinity for oxygen *,	Earths.
	Potass and soda.
	Fluoric and Boracic acids.

Although, from their not having been yet decompounded, the muriatic, fluoric, and boracic acids are enumerated here, their properties are detailed under the head of acids; for there is every analogical reason for believing them to be compounds.

In treating of these substances, I shall begin with the first class, on account of the very great influence of caloric on all chemical actions: but, of the second class, I shall first consider the last order, because they are tangible objects, considerably permanent in their properties, and simple in their action; and because the reader will thus become gradually familiarized with chemical language, before entering upon the consideration of substances, whose properties are scarcely the objects of our senses, and which are highly alterable in their nature, and complicated in their action.

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* The brilliant discoveries lately made by Mr. Davy have shewn, that this arrangement, and, indeed, every other synthetic arrangement, of the objects of chemistry, is incorrect: but it was thought better to retain it, as it is, than to attempt any new arrangement, which would probably require to be altered in the next edition; and to give, in the preface, a summary and connected view of his experiments.

23. Compound bodies may be divided into

- a. *Primary compounds* (9. *a*) consisting of simple substances combined with each other. These may be subdivided into binary, ternary, quaternary, &c. according to the number of their constituents.
- b. *Secondary compounds* (9. *b*) consisting of compound bodies combined with simple bodies, or with each other.

This division is convenient, but arbitrary, as we are in fact ignorant of what are really simple bodies, and cannot ascertain the manner of combination in bodies compounded of three or more elements.

As the chemical nature of bodies is determined by their action on each other, and as, in every case, we should endeavour to advance from what is known to what is not known, the simple substances will first be described, and then such of the primary compounds, which they form with substances already treated of, as are not more conveniently arranged in separate classes.

LIGHT.

24. Light emanates in every direction from visible bodies.

25. It moves in straight lines, with a velocity equal to 164,000 miles in a second.

26. Its gravity is not appretiable.

27. When a ray of light passes very near a solid body, it is *inflected* towards it.

28. When it passes at a distance somewhat greater, it is *deflected* from it.

29. When a ray of light falls upon a polished surface, it is *reflected* from it, and the angle of reflection is equal to the angle of incidence.

30. Bodies which do not allow light to pass through them are termed *Opaque*.

31. Bodies which allow it to pass freely through them are termed *Transparent*.

32. When a ray of light passes obliquely from one medium into another of greater density, it is bent towards the perpendicular; but if the second medium be of less density, it is bent from the perpendicular. The light, in both cases, is said to be *Refracted*.

33. The refracting power of bodies is proportional to their densities, except with regard to inflammable bodies, of which the refracting power is greater than in proportion to their densities.

34. By means of a triangular prism, light is separated by refraction into seven rays; red, orange, yellow, green, blue, indigo, and violet.

35. These rays are permanent, and suffer no further change by reflection or refraction.

36. They differ in flexibility and refrangibility; the red possessing these properties in a less degree than the orange, the orange than the yellow, and so on in the order of their enumeration.

37. The *illuminating power* of the different rays is greatest between the yellow and green, and gradually declines towards both ends of the spectrum.

38. The different colours of bodies depend on their transmitting or reflecting those rays only which constitute their particular colours.

39. White consists of the whole prismatic rays united.

40. Black is the total absence of light, or complete suffocation of all the rays.

41. The sun's rays possess the power of heating bodies.

42. The *heating power* of the different rays is inversely as their refrangibility. But as this power is greatest at some distance beyond the red end of the visible spectrum, it is probable that it is totally independent of the colorific rays.

43. Bodies are heated by light inversely as their transparency, and directly as the number of rays suffocated by them.

44. The sun's rays possess the chemical property of separating oxygen from many of its combinations.

45. The *disoxygenizing power* of the different rays is in proportion to their refrangibility. But as this power is greatest at a small distance beyond the violet end of the visible spectrum, it is probable that it is totally independent of the colorific or calorific rays.

46. Light is absorbed by many bodies, and again emitted by them in the dark.

47. The sources of light are the sun's rays, phosphori, combustion, combination, heat, and percussion.

48. Light is supposed by many to exist in a latent state in all combustible bodies.

CALORIC.

49. Heat, in common language, is a term employed to express both a certain sensation, and the cause producing that sensation. In philosophical language, it is now confined to the sensation, and the term *Caloric* has been adopted to express the cause.

50. The particles of caloric repel each other: it is therefore disposed to fly off in every direction from a body in which it is accumulated, or to pass off by radiation.

51. Caloric is attracted by all other bodies. It has therefore an irresistible tendency so to distribute itself as to produce an universal equilibrium of temperature, or to pass from bodies in which it is accumulated, into bodies in which it is deficient, until the attraction of each for caloric, and the repulsive force (50) of the caloric contained in each become equal to each other.

52. Caloric is radiated most slowly by polished metallic surfaces, and most quickly by rough blackened surfaces.

53. Radiated caloric is admitted most readily by rough blackened surfaces, and most difficultly by polished metallic surfaces.

54. Radiated caloric is transmitted with the velocity of light; and is, in like manner, reflected and refracted.

55. But the passage of caloric through most bodies is immensely slower than radiated caloric.

56. When caloric moves through bodies with this diminished velocity, it is said to be conducted by them. Metals are the best conductors; then stones, glass, dried wood. Spongy bodies, in general, are bad conductors. Fluids also conduct caloric; but as they admit of intestine motion among their particles, they carry it more frequently than they conduct it.

57. *Temperature* is that state of any body, by which it excites the sensation of heat or of cold, and produces the other effects which depend on the excess or deficiency of caloric.

58. The most general effect of caloric is *expansion;* the only real exception to this law being the contraction of water, from the lowest temperature at which it can remain fluid, to 42° 5′ F. This expansion either consists,

- *a.* in a simple increase of volume; or
- *b.* it produces a change of form in the substance heated.
    - *a. a.* from solid to fluid; *fusion, liquefaction.*
    - *b. b.* from solid or fluid to vapour; *vaporization.*

59. Bodies expand gradually, and at all temperatures, as long as they undergo no other change.

60. Bodies differ very much in the degree of gradual expansion (58. *a*) which equal increments of temperature produce in them. Gases are more expansible than fluids, fluids than solids. The individuals of each form of aggregation also exhibit considerable differences.

61. The change of form (58. *b*) occurs suddenly, and always at certain degrees of temperature.

62. *Vaporization* is much retarded by increase of pressure, and facilitated by its diminution, insomuch, that those substances which, under the ordinary pressure of the atmosphere, seem to pass at once from the state of solid to that of vapour, may, by

the application of sufficient pressure, be made to assume the intermediate state of fluidity; while, on the contrary, all fluids which have been hitherto tried, begin in a vacuum to boil and to emit vapour, when their temperature is lower, by 120° at least, than their vaporific point, at the ordinary pressure of the atmosphere.

63. From analogy, all bodies are considered as solid when totally deprived of caloric, but they are termed solid, fluid, or gaseous (17), according to the state in which they exist at the ordinary temperature of the atmosphere. They are also termed fusible or infusible, volatile or fixed, condensible or permanently elastic, according to the effects of caloric upon them.

64. Another very general effect of caloric is *increaſed temperature.*

a. This effect is constant when bodies retain their form of aggregation, or undergo the gradual species of expansion (58. *a*);

b. but while they undergo the sudden species (58. *b*), they remain at one determinate temperature, that necessary for their fusion or vaporization, until the change be completed throughout the whole mass.

65. During the time necessary to effect this, the influx of caloric continues as before; and as it does not increase the temperature, it is said to become latent or combined.

66. The caloric necessary for these changes (64. *b*) is best denominated the caloric of fluidity, and the caloric of vaporization; and its quantity is determinate with regard to each substance.

67. The absolute caloric, or total quantity of caloric contained in any body, is perfectly unknown; but the quantity which increases the temperature of any body a certain number of degrees, is termed its Specific caloric; (Capacity for caloric, of Black, Crawford, and others), when its weight is the object of comparison; and by Dr. Thomson, its Capacity for caloric, when its volume is considered. The specific, and therefore the absolute, caloric of bodies, varies very much.

68. *Incandescence* is the least general effect of caloric, as it is confined to those substances which are capable of supporting the very high temperature necessary for its production, without being converted into vapour or gas.

69. On the living body caloric produces the sensation of heat, and its general action is stimulant. Vegetation and animal life are intimately connected with temperature, each climate supporting animals and vegetables peculiar to itself.

70. Caloric influences affinity, both on account of the operation of its own affinities, and of its facilitating the action of bodies, by counteracting cohesion (17). For the latter reason, it also promotes solution, and increases the power of solvents.

71. The general effects of the abstraction of caloric, are *diminution of volume*, *condensation*, *diminution of temperature*, and *sensation of cold*. It also influences affinity, and, in general, retards solution. The abstraction of caloric never can be total; and the attempts to calculate the thermometrical point at which it would take place, although ingenious, are not satisfactory. Those most worthy of attention place it about —1500° F.

72. The means employed to increase temperature are, the rays of the sun, collected by means of a concave mirror, or double convex lens, electricity, friction, percussion, collision, condensation, and combustion. Temperature is diminished by rarefaction, evaporation, and liquefaction.

73. Temperature is estimated relatively by our sensations, and absolutely by means of various instruments. The thermometer indicates temperature by the expansion which a certain bulk of fluid undergoes from the addition of caloric, and by the condensation produced by its abstraction. Mercury, from the uniformity of its expansion, forms the most accurate thermometer; but for temperatures in which mercury would freeze, alcohol must be employed. Air is sometimes used to shew very small variations of temperature. The pyrometer of Wedgwood, which is employed for measuring very high temperatures, depends upon the permanent and uniform contraction of pure clay at these temperatures.

ELECTRICITY.

74. The particles of the electric fluid repel each other, with a force decreasing as the distances increase.

75. They attract the particles of other bodies, with a force decreasing as the distances increase; and this attraction is mutual.

76. They are dispersed in the pores of other bodies, and move with various degrees of facility through different kinds of matter.

a. Bodies, through which they move without any perceivable obstruction, are called *Non-electrics*.

b. Bodies, through which they move with very great difficulty, are called *Electrics*.

77. The phenomena of electricity arise

a. from the actual motion of the fluid from a body containing more, into another body containing less of it;

b. from its attraction or repulsion, independently of any transference of fluid.

78. By rubbing electrics on each other, the distribution of the electric fluid in them is altered. On separating them, the one contains more, and the other less, than the natural quantity; or, the one becomes positively, and the other negatively electrified.

79. Electrics may also be excited by rubbing them with non-electrics.

80. If a body B be brought into the neighbourhood of an electrified body A, B becomes electrified by position.

81. If a body B be insulated, that is, in contact with electrics only, when brought into the neighbourhood of an electrified body A, a spark passes between them, accompanied by noise. B becomes permanently electrified, and the electricity of A is diminished.

82. When a body A has imparted electricity to another body B, they repel each other, unless B shall have afterwards imparted all its electricity to other bodies.

83. Bodies repel each other, when both are positively or both negatively electrified.

84. Bodies attract each other, when the one is positively and the other negatively electrified.

85. If either of the bodies be in the natural state, they will neither attract nor repel each other.

86. The spark (80) is accompanied by intense increase of temperature, and will kindle inflammable bodies.

87. It produces very remarkable chemical effects, depending chiefly on sudden and momentary increase of temperature, and on the light produced.

88. Electricity acts on the living system as a stimulus

GALVANISM.

89. The phenomena of galvanism seem to depend solely on the agency of electricity, excited during certain chemical actions.

90. It is excited by arranging at least three heterogeneous bodies (for instance, two metals and a fluid) in such a manner, that the two metals be in direct contact with each other, in one part, and have the fluid interposed between them in another.

91. The pile of Volta, by which it is rendered most manifest, is constructed, by combining a series of simple galvanic arcs into one continuous circle, in one uniform order of arrangement.

92. The solids capable of exciting galvanism, are the metals and charcoal; and the most efficient fluids are certain saline solutions.

93. The effects of the simple galvanic circle on the animal body, are the production of a sensation of light when applied to the eye; of an acid taste on the tongue; and the excitement of the muscles through the medium of the nerves.

94. The pile, when well constructed, besides these effects, also gives a shock and spark resembling those of electricity (80), and proves, that the galvanic action is always accompanied by

the decomposition of the fluid, and a combination of one of its constituents with one of the metals.

MAGNETISM.

95. If an oblong piece of iron be suspended freely, it will assume a determinate position with regard to the axis of the earth.

96. When the same end always points in the same direction, it is said to possess polarity, or to be a magnet.

97. The similar poles of two magnets repel each other, and the dissimilar poles attract each other, with a force decreasing as the distances increase.

98. Any piece of iron, when in the neighbourhood of a magnet, is a magnet; and its polarity is so disposed, that the magnet and iron mutually attract each other.

99. Magnetism does not seem to affect sensibility or irritability, or to influence chemical action.

SALIFIABLE BASES.

100. The great bulk of this globe consists of earths and stones. Although these vary infinitely in their external character and physical properties, they are found to consist of a very few substances, mixed together in different proportions, and modified by external agents.

101. These elementary substances are termed *Earths*. Their general characters are, total want of inflammability, infusibility, fixedness, a specific gravity less than 5, inalterability, whiteness, dryness, brittleness, sparing solubility in water, insolubility in alcohol, and, in general, insipidity and want of smell, capability of forming chemical compounds with acids, alkalies, sulphur, phosphorus, and oils, and fusibility when mixed with each other, or with alkalies, into colourless glasses, enamels, or porcelains.

102. *Alkalies* are a class of bodies which are commonly defined to be incombustible, soluble in water and in alcohol, caustic, and capable of neutralizing the acids, of combining with oils, earths, sulphur, and phosphorus, and of changing vegetable blues and reds to green: but as many of these properties are possessed in a greater or less degree by substances usually classed with the earths, and as there is a continual gradation from the insipidity, insolubility, and infusibility of silica, to the causticity, solubility, fusibility, and comparative volatility of potass, they are sometimes classed together under the general name of *Salifiable Bases*.

CLASSIFICATION OF SALIFIABLE BASES.

- A. Alkalies.
  - *a.* Gaseous, *Ammonia.*
  - *b.* Solid, volatilizable.
    - 1. Potass.
    - 2. Soda.
- B. Earths.
  - *a.* Capable of neutralizing acids, and tinging vegetable blues green.
    - *Alkaline Earths.*
      - 1. Barytes.
      - 2. Strontites.
      - 3. Lime.
      - 4. Magnesia.
  - *b.* Incapable of neutralizing acids, and having no effect on vegetable blue colours.
    - *Earths Proper.*
      - 1. Alumina.
      - 2. Zirconia.
      - 3. Glucina.
      - 4. Yttria.
      - 5. Silica.

EARTHS PROPER.

103. *Silica*, when obtained perfectly pure by art, is in the form of a very fine white powder, hard, rough, and gritty, to the touch; when applied to the tongue, giving a rough and dry sensation, but without taste or smell, having a specific gravity of 2.66; when completely disaggregated, soluble in 1000 times its weight of water; soluble in the fixed alkalies and fluoric acid; fusible with the fixed alkalies and other earths; and combining, by fusion, with the metallic oxides, and the phosphoric and boracic acids. It has a tendency to crystallization, and its ultimate particles seem to be transparent. It in general imparts to the fossils, of which it is a principal constituent, transparency, lustre, a tendency to crystallization, and a degree of hardness, enabling them to strike fire with steel. Rock-crystal, quartz, agate, flint, calcedony, jasper, shorl, are examples of siliceous stones.

104. *Zirconia* is obtained in the form of a fine white powder, almost soft to the touch; without taste or smell; having, in a state of aggregation, a specific gravity of 4.3; insoluble in water; infusible by heat alone; but, when surrounded by charcoal, its particles become agglutinated, and so hard as to strike fire with steel; soluble in all the acids; fusible with silex and alu-

mina; insoluble in the alkalies, but soluble in their carbonates. It is only found in the zircon or jargon of Ceylon, and in different varieties of hyacinth.

105. *Alumina* is obtained in friable fragments, or in a very fine white powder; soft and unctuous to the touch; adhering strongly to the tongue, absorbing its moisture, and producing a slightly styptic effect upon it; specific gravity 2; insoluble in water, but very diffusible through it; absorbing a certain quantity of it rapidly, and forming with it a very ductile adhesive paste, which contracts and hardens remarkably in the fire, but is perfectly infusible. Its ultimate particles seem to be opaque. It combines with most of the acids, and these compounds have a sweetish styptic taste; it unites with charcoal, the alkalies, baryta, strontia, lime, and silica; it is manufactured into porcelain and glass. Fossils, containing much alumina, have generally a laminated structure; it exists crystallized in sapphire; and it forms the basis of all clays, boles, mica, trap, basaltes, slate, and corundum.

106. *Yttria* (Gadolina) is obtained in the form of a fine white powder, without taste or smell; insoluble in water; it does not alter vegetable blues; is infusible; insoluble in the alkalies, but readily soluble in the carbonate of ammonia. With the acids it forms salts, which have a sweet and somewhat austere taste. It has been found only in the gadolinite.

107. *Glucina* is obtained in white light masses or powder, of a soft feel, insipid, but adhering strongly to the tongue; apyrous; and insoluble in water, but forming in it a paste, slightly ductile and adhesive; it is soluble in potass, soda, and carbonate of ammonia; it combines with most of the acids, forming soluble salts, difficultly crystallizable, of a sweet and somewhat astringent taste, and with sulphuretted hydrogen. It has hitherto been found, very sparingly, only in the beryl and emerald.

ALKALINE EARTHS.

108. *Magnesia* is obtained in light, white, friable masses, or very fine powder; to the touch it is very fine; its taste is not very sensible, but peculiar and pleasant; its specific gravity is 2.33. It is insoluble in water, but forms with it a paste without ductility. It is apyrous; slightly alters vegetable blues to green; forms soluble compounds with most acids, and unites with sulphur. The fossils in which it predominates are generally soft, and have an unctuous feel; the principal are talc, steatites, asbestus, &c. *Officinal.*

109. *Lime* is obtained in the form of a grey stone, or in fragments more or less pulverulent and white; warm, acrid, and urinous to the taste; reddening the skin when applied to it for

any time; specific gravity 2.33. It is soluble in 450 times its weight of water, and has a strong attraction for it. If a certain proportion of water be thrown upon fresh burnt lime, it is absorbed rapidly, with the extrication of considerable heat, and some phosphorescent light; at the same time the lime crumbles down into a very fine, white, dry powder, augmented much in bulk, but less caustic than before. Lime, thus slaked, does not renew these phenomena, on a further addition of water, but may be diffused or dissolved in it. It is apyrous; it changes vegetable blues to green; it combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus; it is very abundant in the mineral kingdom, and forms the bases of animal bones and shells. The calcareous spars, marble, limestone, chalk, and marl, consist chiefly of lime. *Officinal.*

110. *Strontia* is obtained in small, whitish grey, and often porous masses; its taste is warm, acrid, and urinous; it is slightly caustic, acting feebly on animal matters. Taken into the stomach, it is not poisonous; its specific gravity is nearly 4; it is soluble in 200 times its weight of water at 50°, but in little more than six times its weight of boiling water, which, on cooling, deposites flat rhomboidal crystals; it is slaked more rapidly than lime, and it is infusible; it changes vegetable blues to green; it combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus, alumina, and silex. It is the basis of some of the heavy spars.

111. *Baryta* is obtained in small, grey, porous masses, of tolerable solidity; its taste is acrid, urinous, and pungent; applied to the skin, it proves caustic, and it is deleterious when swallowed; its specific gravity is 4; it is soluble in twenty times its weight of cold water, and in twice its weight of boiling water; depositing, on cooling, transparent, white, prismatic crystals; when slaked, it boils up with violence, becomes very hot, increases in bulk, and is changed into a spongy white mass. It changes vegetable blues to green; it is fusible; and combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus. It is the basis of some of the heavy spars.

ALKALIES.

112. *Soda* is got in the form of solid plates, of a greyish white colour, urinous taste, and burning causticity; acting with considerable violence on animal matter. Water, in a certain proportion, when thrown upon it, is absorbed and solidified, with the disengagement of caloric, and a lixivial smell. A larger quantity dissolves it. From the atmosphere it absorbs moisture and carbonic acid, becoming less caustic. In the fire it melts like an oily substance; boils, and is converted into vapour; but

is incombustible. It is crystallizable into transparent prismatic crystals. It changes vegetable blues to green; unites with all the acids, oils, sulphur, sulphuretted hydrogen, phosphorus, many metallic oxides, and the earths. It forms the basis of rock-salt, and sea-salt; is obtained from the ashes of marine plants, and exists in some minerals.

113. *Potass* is a solid, white substance; extremely acrid to the taste; unctuous to the feel, but highly caustic; destroying the skin, and dissolving all soft animal substances. It is deliquescent, and soluble in half its weight of water at 58° Fahrenheit; it is fusible, and may be vaporized, but is perfectly incombustible; it is capable of crystallizing into very long quadrangular, compressed prisms, terminated by sharp pyramids; it changes vegetable blues to green, and combines with all the acids, oils, sulphur, sulphuretted hydrogen, and the earths. It is obtained from the ashes of vegetables, and exists in some minerals. *Officinal.*

114. *Ammonia* is always classed with the alkalies, from the analogy of its taste, causticity, combinations with the acids, and effects upon vegetable blues; but as it differs in many particulars, being extremely volatile, readily decomposed, and formed in many chemical operations, and its composition well known, I have referred it to that place which, in this artificial arrangement, the nature of the composition indicates. *Officinal.*

PRIMARY COMPOUNDS OF THE SALIFIABLE BASES.

A. With each other; *earthen ware; glass.*
B. With sulphur; *alkaline and earthy sulphurets.*
C. With phosphorus; *alkaline and earthy phosphurets.*

115. The substances of this class exert a considerable action on each other. Potass was long believed to be the only solvent of silica; and it is now further proved, that the whole of this class are capable of combining, when presented to each other in a state of solution; and on this property, in part, the effect of mortars depends. Their action on each other, by means of heat, is of much greater importance, as it includes the theories of the manufactures of porcelain and glass.

116. *Porcelain*, and all kinds of earthen ware, consist of alumina and silica, mixed in different proportions into a plastic mass, fabricated into various shapes, dried and exposed to the heat of a furnace, where they undergo a kind of semifusion. They are glazed by being thinly covered with a more fusible composition, and may be afterwards painted with enamels, which are still more fusible than the glazing.

117. *Glass* is composed by melting about equal parts of potass or soda with silica. It is harder and more durable in proportion to the excess of the silica. The transparency of glass depends upon its being cooled quickly; for if cooled very slowly, it assumes a radiated crystalline appearance, and becomes perfectly opaque. By melting silica with about three times its weight of soda or potass, a glass is obtained, which not only is soluble in water, but even attracts moisture from the atmosphere. This solution has long been known by the name of Liquor of Flints. The property which metallic oxides have of rendering glasses more fusible, and of imparting to them certain colours, has given rise to the arts of imitating precious stones, and of enamelling.

OXYGEN.

118. *Oxygen* is the principle on which most of the chemical qualities of atmospheric air depend. Its tendency to combination is so strong, that it has never been procured in a separate state. Oxygen gas, or the combination of oxygen with caloric, is its most simple form. This is permanently elastic, compressible, transparent, inodorous, and insipid. Its specific gravity is 0.00135. It supports inflammation, is necessary for respiration and vegetation, and is decomposed in all these processes; it constitutes 0.22 of the bulk of atmospheric air. Oxygen is also a principal constituent in water, in all acids and metallic oxides, and in almost all animal and vegetable substances. It is separated from many of its combinations by the sun's rays.

OXYGENIZEMENT.

119. As the characteristic distinction between the simple substances already treated of, and those which remain to be examined, consists in the former possessing no affinity whatever for oxygen, and in the latter having a more or less strong attraction for it, it will be proper to explain, in this place, the general phenomena which attend the combination of oxygen with oxygenizable bases. The term *Combustion* has been, by the French chemists, incorrectly extended to all these combinations; for, in common language, that word is applied to cases in which oxygen is not an agent, and always supposes the production of heat and light, although in numberless instances of oxygenizement these phenomena do not appear.

120. *Oxygenizement* is an example of chemical union, and is subjected to all the laws of affinity. It requires the presence and contact of oxygen, and of another substance possessing affinity for it.

121. Oxygenizable bases attract oxygen with very different degrees of force. This attraction is much influenced by temperature. Thus charcoal, which at ordinary temperatures seems to possess no attraction for oxygen, unites with it rapidly, and almost inseparably, when heated to ignition.

122. Oxygen combines with most oxygenizable substances in certain definite proportions, perhaps only in one, and the apparent variety of proportions may be owing to a second or third similar combination of the first compound with another quantity of oxygen, or of the base; and of the second compound with a third quantity.

123. The attraction between oxygen and the oxygenizable bases, is in the inverse ratio of saturation; or, in other words, the affinity by which they form their primary combinations, is stronger than that by which they form any secondary combination, and so on progressively.

124. In many instances, oxygenizement is so strongly opposed by cohesion, that it does not take place unless assisted by a degree of heat sufficient to melt or vaporize the oxygenizable base.

125. It is also often accompanied by the extrication of caloric and light in a very conspicuous degree. To these the term combustion should be confined; and only such oxygenizable bases as are capable of exhibiting these phenomena are combustible. These phenomena depend upon the new compound having a weaker affinity or less capacity than its constituents for light and caloric, which are therefore extricated.

126. If the combustible body be vaporized, flame is produced, and the process is then denominated *inflammation*.

127. By its union with oxygenizable substances, oxygen undergoes various changes in its properties. In many instances, the compounds of oxygen are fluid or solid, opaque, coloured, incapable of supporting inflammation, and deleterious to animal or vegetable life. The changes which the oxygenizable bases undergo, are no less conspicuous. Their form, colour, taste, odour, density, permeability to light and electricity, specific caloric, and, finally, their affinities, are often totally altered.

128. When, in consequence of oxygenizement, any substance acquires a sour taste, and the properties of converting vegetable blues to red, and of saturating or destroying the characteristic properties of alkalies and earths, it is said to be acidified, and such compounds are termed *Acids*.

129. When it does not acquire these properties, the compounds are termed *Oxides*.

130. Many oxides are capable of being converted into acids, by combination with an additional quantity of oxygen.

131. Oxygen is capable of combining at the same time with

two or more substances; and the oxides or acids which result from such combinations, are termed Oxides or Acids with a double or triple base.

132. In general, the bases which are least simple, unite with oxygen in the greatest variety of proportions.

PRIMARY COMPOUNDS OF OXYGEN.

A. Binary,
  a. with nitrogen:
    1. Atmospheric air.
    2. Nitrous oxide.
    3. Nitric oxide.
    4. Nitrous acid.
    5. Nitric acid.
  b. With hydrogen: water.
  c. With carbon:
    1. Incombustible coal, plumbago.
    2. Charcoal, (carbonous oxide).
    3. Gaseous oxide of carbon, (carbonic oxide).
    4. Carbonic acid.
  d. With Sulphur:
    1. Oxide of sulphur.
    2. Sulphureous acid.
    3. Sulphuric acid.
  e. With Phosphorus:
    1. Oxide of phosphorus.
    2. Phosphorous acid.
    3. Phosphoric acid.
  f. With metals;
    1. Metallic oxides.
    2. Metallic acids.
B. Ternary,
  With carbon and hydrogen:
  a. Oxides. Hydro-carbonous oxides, carburetted hydrogen gas, olefiant gas, alcohol, ether, oil, vegetable substances.
  b. Acids. Vegetable acids.
C. Quaternary, with hydrogen, carbon, and nitrogen.
  a. Oxides. Animal substances.
  b. Acids. Animal acids.

NITROGEN, (AZOTE).

133. *Nitrogen,* or *azotic gas,* constitutes 0.78 of the atmosphere; but as it has few attractions at ordinary temperatures,

its principal effect on the chemical properties of the atmosphere seems to be the dilution of the oxygen gas, which in its pure state would be more active than is consistent with the economy of nature. It is permanently elastic, compressible, inodorous, and insipid; it converts very delicate vegetable blues to green; its specific gravity is 0.0012; it is unable to support respiration, vegetation, or combustion; it is acidifiable; it dissolves phosphorus and carbon in small quantities, and is not absorbed by water.

PRIMARY COMPOUNDS OF NITROGEN.

A. Binary,
  a. With oxygen:
    1. Atmospheric air.
    2. Nitrous oxide.
    3. Nitric oxide. (Nitrous gas).
    4. Nitrous acid.
    5. Nitric acid.
  b. With hydrogen. Ammonia. (Nitroguret of Hydrogen).
  c. With sulphur. Sulphuretted nitrogen gas.
  d. With phosphorus. Phosphuretted nitrogen gas.
B. Quaternary, with hydrogen, carbon, and oxygen.
  a. Oxides. Animal substances.
  b. Acids. Animal acids.

134. *Atmospheric air* consists of 22 parts of oxygen gas, and of 78 of azotic gas by measure, or 24.33, and 75.67 by weight; it is transparent, compressible, and permanently elastic; its specific gravity is 0.00123; it is inodorous and insipid, respirable, and capable of supporting inflammation. The atmosphere also contains other gases, vapour, &c.

135. *Nitrous oxide gas* is composed of 37 of oxygen, and 63 of nitrogen. It does not change vegetable colours; its specific gravity is 0.00197; it suffers no diminution when mixed with oxygen gas. Water absorbs about half its bulk of it, at a mean temperature. It does not combine directly with alkalies; it supports combustion; and its respiration, when perfectly pure, or mixed with atmospheric air, produces the highest excitement the animal frame seems capable of undergoing.

136. *Nitric oxide gas* (nitrous gas) consists, according to Davy, of 44 nitrogen and 56 oxygen. It does not change vegetable colours. Its specific gravity is 0.001343. When mixed with about two fifths of oxygen gas, the compound condenses into red fumes (nitrous acid), which are entirely absorbed by water. The quantity of oxygen gas which any air contains is

sometimes estimated by the diminution of volume which occurs, after a due proportion of nitrous gas has been added. Water absorbs 0.118 of its bulk of this gas. It is not inflammable, and only in very few instances supports combustion. It is noxious to vegetation, and its respiration is fatal to animals.

137. Nitrogen admits of higher degrees of oxygenizement, forming nitrous and nitric acids (200, 202).

HYDROGEN.

138. *Hydrogen gas* is often found collected in mines and caverns. It is permanently elastic and compressible. Its specific gravity is 0.000094, being the lightest body with which we are acquainted. It is highly inflammable, burning with a blue flame, when kindled in contact with oxygen gas or atmospheric air, and detonating when mixed with them. It extinguishes flame, and is deleterious to animal life. It dissolves sulphur, phosphorus, and carbon, forming with them peculiar fetid gases.

PRIMARY COMPOUNDS OF HYDROGEN.

A. Binary,
  a. With oxygen; water.
  b. With nitrogen; ammonia.
  c. With sulphur; sulphuretted hydrogen.
  d. With phosphorus; phosphuretted hydrogen.
B. Ternary, with carbon and oxygen:
    a Oxides; hydro-carbonous oxides. Vegetable substances.
    b. Acids; vegetable acids.
C. Quaternary,
  With carbon, nitrogen, and oxygen:
    1. Animal oxides.
    2. ——— acids.

139. *Water* consists of hydrogen combined with oxygen, in the proportion of 14.42 to 85.58. Water is transparent, colourless, inodorous, and insipid. As water is assumed as the standard, or unity, in all tables of specific gravity, it is necessary to know that a cubic inch of it weighs, at 30 inches barometer, and 60° thermometer, 252.422 grains. At 32° it exists in a solid form, and is crystallized. At 212° it expands to 2000 times its bulk, and is converted into a very elastic vapour. It absorbs small quantities of the simple gases, especially oxygen. It dissolves several of the salifiable bases, and in some degree all

saline bodies, and is essential to their crystallization. It is composed and decomposed in many instances, and its chemical agency is almost universal.

140. *Ammonia* (hydroguret of nitrogen) consists of 80 parts of nitrogen with 20 of hydrogen. It exists in its purest form combined with caloric as a gas, which is perfectly transparent and colourless, elastic and compressible; specific gravity 0.000732; has a urinous and acrid odour, irritating the nostrils and eyes, and an acrid and caustic taste; does not dissolve animal substances; is irrespirable; extinguishes flame; colours vegetable blues green; and is decomposed by being transmitted through a red-hot tube, and by the electric spark, into its constituent gases; and by oxygen and atmospheric air at a red heat; and by oxymuriatic acid, it is converted into water and nitrogen gas. It is absorbed without change by porous bodies; it dissolves sulphur and phosphorus, and combines readily with water in all its states. Water is saturated by one-third of its weight of gaseous ammonia, and is thereby increased in bulk, and acquires the specific gravity of 0.905. Ammonia combines with all the acids, forming neutral salts. It is formed during the putrefactive fermentation, and is commonly classed with the alkalies. *Officinal.*

CARBON.

141. *Carbon,* in a state of perfect purity and extreme aggregation, is well known by the name of diamond. It possesses the highest degree of lustre, transparency, and hardness. It is crystallized, and generally colourless. Its specific gravity is from 3.44 to 3.55. It is insoluble in water, and can neither be melted nor vaporized by caloric. It is not acted upon by any chemical agent, except oxygen at very high temperatures. When exposed in oxygen gas to the rays of the sun, concentrated by a very powerful lens, its surface becomes sensibly blackened; it is ignited, and at last consumed. The result of this combustion it carbonic acid gas; 100 parts of which consist of 28.60 of carbon, and 71.40 of oxygen. It combines with iron, forming steel. It is a constituent of almost all animal and vegetable substances; and an oxide of carbon is obtained from them by exposing them to heat in closed vessels.

142. *Plumbago* and *incombustible coal* are carbon in a state of less aggregation, and somewhat impure. The most remarkable known property of this substance, is the very high temperature necessary for its combustion.

143. Common *Charcoal* of wood, is another, and the commonest form of carbon. It is obtained in the form of solid masses, of a black colour. It has neither smell nor taste. It is

brittle, and never crystallized. It absorbs light strongly, is refractory in the fire, insoluble in water, and a bad conductor of caloric, but an excellent one of electricity. At a red heat, it burns rapidly in oxygen gas; 28 of charcoal, and 72 of oxygen, forming 100 of carbonic acid gas. It also burns in atmospheric air, but less vividly. *Officinal.*

PRIMARY COMPOUNDS OF CARBON.

A Binary.
  a. With oxygen:
    1. Gaseous oxide of carbon (carbonic oxide gas).
    2. Carbonic acid.
  b. With metals; metallic carburets.
B. Ternary, with oxygen and hydrogen:
  1. Oxides.
    a. Hydro-carbonous.
    b. Alcohol.
    c. Ether.
    d. Fixed oil and fats.
    e. Wax.
    f. Adipocere.
    g. Volatile oils.
    h. Resins.
    i. Guaiacum.
    k. Bitumens.
    l. Camphor.
    m. Starch.
    n. Asparagin.
    o. Inulin.
    p. Sarcocoll.
    q. Sugar.
    r. Jelly.
    s. Tannin.
  2. Acids.
    a. Acetic
    b. Oxalic.
    c. Tartaric.
    d. Citric.
    e. Malic.
    f. Lactic.
    g. Gallic.
    h. Mucic.
    i. Benzoic.
    k. Succinic.
    l. Camphoric.
    m. Suberic.
    n. Laccic.
    o. Sebacic.
    p. Moroxylic.
    q. Mellitic.
    r. Formic.
    s. Kinic.
C. Quaternary, with nitrogen, hydrogen, and oxygen.
  1. Oxides.
    a. Gum.
    b. Ulmin.
    c. Tragacanth.
    d. Extractive.
    e. Gum-resin.
    f. Bitter principle.
    g. Narcotic principle.
    h. Acrid principle.
    i. Cinchonin.
    k. Indigo.
    l. Lignin.
    m. Cotton.
    n. Suber.
    o. Birdlime.
    p. Caoutchouc.
    q. Gelatin.
    r. Albumen.
    s. Fibrin.
    t. Urea.

2. Acids.
   a. Prussic. *b.* Uric. *c.* Rosasic. *d.* Amnic.

144. *Gaseous oxide of carbon* (carbonic oxide gas), is carbon in its first degree of oxidation. It is invisible and elastic; specific gravity 0.001167. It does not support combustion or respiration. With oxygen gas it burns with a lambent blue flame, and is converted entirely into carbonic acid, without producing any moisture It has no affinity for lime. It consists of 40.41 carbon, and 59.59 oxygen.

SULPHUR.

145. *Sulphur* is a crystallizable solid, of a yellow colour; little sensible taste; peculiar smell when rubbed or heated; specific gravity 1.99; brittle; electric; fusible at 226°; burning with a pale blue flame at 302°; and with a bright white flame at 570°; and capable of combining with different proportions of oxygen. It is found pure in the vicinity of volcanoes, and exists in many minerals, and in animal substances. *Officinal.*

PRIMARY COMPOUNDS OF SULPHUR.

a. With oxygen:
  1. Oxide of sulphur.
  2. Sulphurous acid.
  3. Sulphuric acid.
b. With nitrogen. Sulphuretted nitrogen.
c. With hydrogen. Sulphuretted hydrogen.
d. With phosphorus. Sulphuretted phosphorus.
e. With salifiable bases. Earthy and alkaline sulphurets.
f. With metals. Metallic sulphurets.

146. *Oxide of sulphur* is of a dark violet colour, and an austere taste, fracture fibrous, specific gravity 2.325; consistence tough. It contains 7 *per cent.* of oxygen. It is formed on the surface of melted sulphur.

147. *Sulphuretted Nitrogen Gas* is only known to have a fetid odour.

148. *Sulphuretted Hydrogen Gas* consists of 71 sulphur and 29 hydrogen; specific gravity 0.000135. It has the odour of rotten eggs; is not respirable; burns with oxygen gas without exploding, and deposits sulphur; is readily absorbed by water, and is the mode in which sulphur exists in mineral waters; reddens vegetable blues; and in its affinities, and the crystallizability

of its compounds, it resembles the acids. *Officinal.* Hydro-sulphuret of ammonia.

149. *Hydroguretted sulphur* is sulphuretted hydrogen combined with an additional portion of sulphur. It has the appearance of a yellow oil.

150. *Sulphurets* are solid opaque bodies, of considerable specific gravity; decomposable by heat, water, and the acids.

a. The alkaline and earthy sulphurets have a red or brownish red colour, and by solution in water are immediately converted into hydro-sulphurets. *Officinal.* Sulphuret of potass.

b. The metallic sulphurets have neither taste nor smell, are often possessed of metallic brilliancy, and are conductors of electricity. *Officinal.* The Sulphurets of antimony, of mercury, of iron.

151. Hydro-sulphurets are soluble in water, and crystallizable, decomposed by the atmosphere and acids.

PHOSPHORUS.

152. *Phosphorus* is a semitransparent solid, slightly brilliant, and of a waxy consistence; specific gravity 1.770; taste in some degree acrid and disagreeable; smell alliaceous. It is brittle under 32°; its fracture is vitreous, brilliant, and sometimes lamellated; above 32° it softens a little, becomes ductile about 90°, melts at 99°, becoming transparent like a white oil; at 180° begins to be vaporized, and at 554° boils. It is crystallizable into prismatic needles or long octohedrons. It exists in many minerals, and is obtained from bones and other animal substances.

PRIMARY COMPOUNDS OF PHOSPHORUS.

a. With oxygen:
  1. Oxide of phosphorus.
  2. Phosphorous acid.
  3. Phosphoric acid.

b. With nitrogen; phosphuretted nitrogen gas.
c. With hydrogen; phosphuretted hydrogen gas.
d. With sulphur; phosphuret of sulphur.
e. With metals; metallic phosphurets.
f. With salifiable bases; alkaline and earthy phosphurets.

153. In its solid state, phosphorus is not acted upon by pure oxygen gas; but when melted, burns in it at 80° with a dazzling splendour, absorbing about half its weight of oxygen, and forming phosphoric acid. In atmospheric air it undergoes a

slow combustion at 43°, emitting light in the dark, but without the production of sensible heat, absorbing a portion of oxygen, and forming phosphorous acid; at 148° it burns rapidly, but less brilliantly than in oxygen gas, forming phosphoric acid. It is therefore always kept immersed in boiled water; but even there its surface is oxidized, becoming white and opaque.

154. *Hydroguretted phosphorus* possesses a peculiar odour, and the property of becoming luminous when mixed with oxygen gas. It may be combined with a much larger proportion of phosphorus, acquiring then a fetid alliaceous odour, a considerable increase of specific gravity, and the property of burning by the simple contact of oxygen, or of the atmosphere, with a very brilliant white flame.

155. *Sulphuretted phosphorus*, and phosphuretted sulphur, are of a yellowish colour, more fusible than either of the components, and exceedingly inflammable.

156. Nitrogen gas dissolves phosphorus, forming a fetid gas, which inflames at a low temperature.

157. Phosphuret of lime is insoluble in water; they decompose each other, producing phosphuretted hydrogen gas, which arises in bubbles to the surface of the water, where they explode with a clear flame. Phosphuret of baryta is a brown mass; of a metallic appearance; very fusible; luminous in the dark; decomposed by exposure to air; emitting an alliaceous smell when moistened; and decomposed by water, furnishing phosphuretted hydrogen gas. The phosphuret of strontia is very similar.

METALS, AND METALLIC OXIDES.

158. Metals are crystallizable; their form depends on the regular tetrahedon or tube; their surface is specular; they are perfectly opaque, even when melted; their colour is various; their lustre peculiar and shining, or splendent; their hardness various, but at least considerable; many of them are brittle, others possess malleability and ductility in a surprising degree, and some are scissile, flexile, or elastic; their fracture in general is hackly; their texture compact, fibrous or foliated; many of them are remarkably sonorous; their specific gravity greater than 5; they possess no smell or taste, unless when heated or rubbed; they are the best conductors of caloric and electricity, are powerful agents in producing the galvanic phenomena, and a few of them are the only substances which exhibit the phenomena of magnetism. By the action of caloric they are melted, but with different degrees of facility, and some of them may be vaporized. Except iron and platinum, they melt suddenly, without undergoing any intermediate state of softness; and when melted, their surface is convex and globular. They are inso-

luble in water; but some of them decompose it, and are oxidized by it.

PRIMARY COMPOUNDS OF THE METALS.

- *a.* With oxygen:
  - 1. Metallic oxides.
  - 2. Acids of arsenic, tungsten, molybdenum, chrome, and columbium.
- *b.* With hydrogen; hydrogurets.
- *c.* With carbon; carburets.
- *d.* With phosphorus; phosphurets.
- *e.* With sulphur; sulphurets.
- *f.* With each other; alloys and amalgams.

159. They are oxidized with different degrees of facility, some by mere exposure to air, and others seem almost to resist the action of heat and air. Their oxidizability is always increased by increase of temperature. Their oxides are in the form of powder, laminæ, or friable fragments; sometimes crystalline; of various colours, determinate with regard to each metal; possess greater absolute weight; are refractory, or fusible into glass; insipid, or acrid and styptic; in general insoluble in water; and combine either with acids and alkalies, or only with one of these. Some of those are disoxygenized by light alone, others by caloric, and others require hydrogen, carbon, &c.

160. Most of them are capable of combining with different proportions of oxygen. Dr. Thomson proposes to call the oxides with a minimum of oxygen, Protoxides; and with additional proportions, Deutoxides, Tritoxides, &c. in succession; and the oxides with a maximum of oxygen, Peroxides.

161. Hydrogen gas is capable of holding arsenic, zinc, and iron, in solution.

162. Carbon unites only with iron.

163. The metallic phosphurets are fusible, brilliant, brittle, granulated, lamellated, scarcely combustible, and permanent.

164. The sulphurets are brittle; crystallizable in large brilliant and metallic laminæ, more easily fusible than the refractory metals, but less easily than the very fusible metals; decomposable by heat, humidity, and the acids.

165. The mixtures of the metals with each other are termed *Alloys:* those in which mercury is contained are *Amalgams.* They acquire by mixture new properties, and are in general more fusible than their components. The reguline metals are not soluble in the acids; but when acted upon by them, are first oxidized, and then dissolved. The metallic oxides, by fusion, colour glasses and enamels.

OXIDIZABLE METALS.

166. *Gold* is of a brilliant yellow colour, insipid, and inodorous; specific gravity between 19.258 and 19.300; soft and flexible: little elasticity or sonorousness; so ductile, that its surface may be extended more than 650,000 times; of very great tenacity; easily hammer-hardened; a good conductor of caloric, electricity, and galvanism; fusing at 32° of Wedgwood; brittle when cooled too quickly; crystallizing in octohedrons; unalterable in the air; converted, by a long and violent heat, into a vitrified violet oxide; oxidized and dispersed by electricity; soluble in alkaline sulphurets; rendered brittle by phosphorus, arsenic, bismuth, tin, and antimony; less brittle by lead; soluble in mercury; hardened by zinc, copper, iron, steel, and silver; oxidizable, of a purple colour, and slightly soluble in nitrous acid; very oxidizable, of a fawn or yellow colour by the nitro or oxy-muriatic acids. Its oxide is easily reduced by light and heat, colours glasses purple or topaz yellow, and forms a fulminating compound with ammonia.

167. *Platinum.* Of a grey, white colour, almost black when polished, insipid, inodorous; specific gravity 20.850 to 21.061; softer only than iron, and less ductile only than gold; most difficult of fusion, above 160° of Wedgwood; a good conductor of electricity and galvanism; unalterable by air and heat; converted into a grey powder, its first degree of oxidation, by electricity; unites with phosphorus; forms alloys with arsenic, bismuth, antimony, mercury, zinc, tin, lead, cast iron, copper, silver, and gold. It is oxidized and dissolved by the oxy-muriatic acid, and more readily by the nitro-muriatic. Oxide grey.

168. *Silver.* Very brilliant, white, insipid, inodorous; specific gravity 10.474 to 11.091; hardness between iron and gold; elasticity between gold and copper; strong acute sound: considerable ductility and tenacity; hardening much under the hammer; a good conductor of electricity, caloric, and galvanism; fusible at 28° Wedgwood: crystallizable by cooling: unalterable in the air: changed into a greenish oxide by long and violent heat, burning with a greenish flame, and instantly by the electric shock. Its phosphuret is granulated, brittle, and fusible; its sulphuret grey, black, lamellated, or striated, and fusible: it unites but slightly with the acidifiable metals and iron: is hardened by gold, bismuth, antimony, tin, lead, and copper, and amalgamates with mercury. It is oxidized and dissolved by the sulphuric, sulphurous, nitric, and oxy-muriatic acids. Its oxide is greenish: reducible by the other metals, hydrogen, and light and heat; colours some glasses of an olive green, and is very soluble in ammonia. *Officinal.*

169. *Copper.* Bright red; disagreeable taste and smell when rubbed or heated; specific gravity 7.79; ductile; of great tenacity: sonorous; fusible at 27° Wedgwood; granulated texture, and subject to blisters; a good conductor of caloric, electricity, and galvanism; becomes brown, and at last green in the air; when heated, turns blue, yellow, violet, deep brown; when ignited and plunged into water, forms brown, brittle scales of oxide. Its phosphuret is brilliant, brittle, hard, and fusible; its sulphuret brown, fusible, and very phosphoric; its alloy with arsenic is white, with bismuth reddish, with antimony violet, with mercury deep red, with zinc forms brass, and with tin is orange; it is oxidized and dissolved by the sulphuric, nitric, and muriatic acids; its oxide is brown, brittle, and soluble in ammonia, acquiring a beautiful blue colour. *Officinal.*

170. *Iron* is of a bluish-grey colour; texture either fine grained, fibrous, or dense plates; sapid and odorous; specific gravity 7.600; the hardest, most elastic, and most tenacious metal; very ductile; fusing at 158° Wedgwood, fusion at first clammy, afterwards very fluid; igniting by strong percussion, and inflaming by the collision of flint; magnetic. It is oxidized slowly in the air, especially when moist; when heated in contact with air, it is changed to a black oxide, containing 0.20 to 0.27 of oxygen; fusible, hard, brittle, lamellated, still attracted by the magnet; afterwards into a brown-red, fine pulverulent oxide, not attracted by the magnet, containing 0.40 to 0.49 of oxygen. It burns with splendour and deflagration in oxygen gas, and is converted into a fused, black oxide; it decomposes water slowly, and when ignited, very rapidly. In some instances it is dissolved in hydrogen gas. Carbon united to iron, converts it into steel. *Officinal*

171. *Steel* is of a grey colour, brilliant and granular in its fracture; specific gravity 7.795; harder than any of the metals, and more elastic, ductile, malleable, and fusible at a lower temperature than pure iron. Its characteristic property is, that after being heated, if suddenly plunged into cold water, it becomes harder, more elastic, less pliable and brittle; but by being again heated and cooled slowly, it acquires its former softness, pliability, and ductility. Steel contains only some hundredth parts of carbon, and is known chemically, by letting a drop of acid fall upon it, which produces a grey or black spot.

172. *Plumbago* consists of about 0.1 of iron, combined with carbon in its first degree of oxidizement. The phosphuret of iron is white, granulated, brittle, permanent in the air. Its sulphuret is yellow, hard, brittle, and very fusible, oxidizing slowly in a humid atmosphere. Iron forms alloys with arsenic, cobalt, manganese, bismuth, antimony, zinc, and tin. Iron is oxidized and dissolved by almost all the acids; oxides black, brown,

red. It gives glasses a brown, smoky, deep green, or black colour.

173. *Lead* is of a grey, blue, livid colour, streak grey, disagreeable taste and odour; specific gravity 11.352; soft; very laminable; hardens little under the hammer; very flexible; slightly tenacious; fusible at 612° Fahrenheit; volatile at a red heat; tarnished in the air; slightly oxidized by air and water; by heat and air it forms a grey, then a yellow, and lastly, a red oxide, which is vitrifiable. Its phosphuret and sulphuret are brittle; it forms alloys with arsenic, bismuth, antimony, mercury, zinc, and tin; it is oxidized by, and combines with, the sulphuric, nitric, muriatic, phosphoric, and other acids. Its oxide imparts to glass a uniform density, and strong refracting power. *Officinal.*

174. *Tin* is pure, brilliant, white, sapid, and odorous; specific gravity 7.291 to 7.500; soft, flexible, and emitting a crackling noise when bent; very malleable; fusing at 442° Fahrenheit; oxidizes slowly in the air; is converted, when fused, into a grey oxide; when red hot it burns vividly. Its sulphuret and phosphuret are lamellated and brittle; it forms alloys with arsenic, bismuth, antimony, mercury, and zinc; it is oxidized by many acids, and combines with the muriatic, fluoric, boracic, and carbonic acids. Its oxide is grey or white, unites readily with sulphur, and renders glasses opaque. *Officinal.*

175. *Zinc* is bluish white, lamellated, sapid, and odorous; specific gravity 7.190; soft, clogging the file; above 212° malleable and ductile; fusible at 700°; vaporizable; a powerful agent in the phenomena of galvanism; oxidized by fusion; at a red heat it catches fire, and emits white films of oxide, which contain about 0.33 oxygen; it is soluble in hydrogen; it combines with phosphorus, sulphur, arsenic, antimony, and mercury; it easily decomposes water; it is oxidized and dissolved by almost all the acids. Oxide, white films. *Officinal.*

176. *Mercury.* Very bright white; specific gravity 13.568; freezing at —39°; boiling at 660°; when frozen, ductile and malleable; oxidizable by trituration in the air, and in a farther degree by the action of the air and heat; does not decompose water; forms amalgams with many metals; and is oxidized and dissolved by the sulphuric, nitric, and oxy-muriatic acids. Oxides black, yellow, red. *Officinal.*

177. *Tellurium.* White, lead-grey, very bright; harsh and brittle; lamellated; crystallizable; specific gravity 6.115; very fusible and volatile; burns with a blue and greenish flame, and a white smoke, having the odour of radish; oxide very fusible into a straw-coloured radiated glass; soluble in sulphuric, nitric, and nitro-muriatic acids; unites with sulphur. Oxides black, white.

178. *Antimony.* White, very brilliant, lamellated; specific gravity 6.702; moderately hard; pulverizable; fusible at 809°; volatile when highly ignited; sensible taste and smell; unalterable in cold air; oxidizable by air and heat; oxide fusible into a yellow brown glass; decomposes water when ignited; oxidized by the sulphuric, nitric, and muriatic acids; combines with phosphorus and sulphur. Oxides black, brown, orange, yellow, white; and colour glass yellow or hyacinthine. *Officinal.*

179. *Bismuth.* White, slightly yellow, in large specular plates; pulverizable: specific gravity 9.822; moderately hard; sensible odour and taste, fusible at 460°, and volatile at a high temperature; oxidizable by heat and air; oxide vitrifiable into a greenish yellow glass; oxidizable by boiling sulphuric, nitric, and muriatic acids; unites with sulphur. Oxides grey, yellow, dirty green, and colour glass of a greenish yellow.

180. *Manganese.* Small whitish grey globules; specific gravity 6.850; very hard and very brittle; very difficult of fusion; very oxidizable by exposure to air; decomposes water rapidly; is oxidized by the sulphuric, nitric, muriatic acids; combines with many metals. Oxides white, red, brown, and black; colour glass brown, violet, or red; discolour glass coloured by iron.

181. *Nickel.* Yellow or reddish white, granulated; specific gravity nearly 9; said to be malleable in a state of purity; magnetic; very difficult of fusion, and of oxidization in the air; oxidizable by most of the acids, which it colours of a brilliant green; combines with phosphorus, sulphur, and the metals. Oxide light clear green, colouring glass brown, orange, red.

182. *Cobalt.* Reddish-grey, fine-grained, pulverizable; specific gravity between 7.770 and 7.800; very difficult of fusion; oxidizable before fusion; unalterable by water; acted on by all the acids; combines with phosphorus and sulphur; its alloys are granulated, rigid, and brittle. Oxide deep blue or black, and colours glasses of a fine blue.

183. *Uranium.* An incoherent mass of small agglutinated globules, of a deep grey and pale brown; specific gravity 6.440; very hard; very difficult of fusion, even by long continued heat; is acted on by several of the acids; combines with phosphorus. Oxide soluble in the alkalies, and very soluble in their carbonates. Oxide yellow, colouring glass of a greenish yellow, emerald green, or brown.

184. *Titanium.* Agglutinated, hard, friable masses, crystallized internally of a brilliant red; infusible; unalterable by water; oxidizable by boiling sulphuric, nitric, and muriatic acids. Oxides blue, deep red, white.

185. *Rhodium.* White, infusible; specific gravity 11; unites with other metals readily, except mercury. Muriate of rhodium

rose-coloured; soluble in alcohol; not precipitated by prussiate of potass, muriate, or hydro-sulphuret, or alkaline carbonates of ammonia; but by alkalies, in the form of a yellow oxide. Soluble in all acids.

186. *Palladium.* Dull white, malleable, ductile, fusible; specific gravity 11.5; hard; forms a red solution with nitro-muriatic acid; affording an orange precipitate with alkalies and earths; and olive-coloured with prussiate of potass.

187. *Iridium.* White; infusible; insoluble in acids, unless when oxidized by an alkali and atmospheric air: muriatic and sulphuric solutions, green and blue; nitric, red. The former give a green precipitate, soluble in excess of alkali; the latter a red, insoluble.

188. *Osmium.* Dark grey or blue; infusible when excluded from the air; insoluble in all acids; oxide forms a yellow solution with potass, and is extremely volatile, smelling like oxy-muriatic acid.

189. *Tantalium.* Insoluble, but oxidizable by acids; oxide white, specific gr. 6.5, forming a soluble compound with alkalies; fusible with borax or phosphate of soda, without colouring them.

190. *Cerium.* Oxides white and red; the former most readily soluble in nitric, and the latter in muriatic and sulphuric acids.

ACIDIFIABLE METALS.

191. *Chromum.* Agglutinated masses of a whitish-grey colour; very hard, very brittle, and very infusible; appears to be difficult to oxidize, and easy to disoxidize; does not appear to decompose water; not attacked by the sulphuric or muriatic acids; changed into a green oxide, and afterwards into a red acid, by the nitric acid distilled from it. Oxide of a beautiful emerald green; acid a red or orange yellow powder.

192. *Molybdenum.* In black powder, or agglutinated, blackish, friable masses, having little metallic brilliancy; specific gravity 6; by a strong heat changes into a white brilliant oxide in needles, and very acidifiable; oxidizable by boiling sulphuric acid, and acidifiable by the nitric acid. It forms a sulphuret; and its alloys are granulated and friable; acid white, pulverulent, styptic; specific gravity 3.400.

193. *Tungsten.* Small slightly adherent globules of a slate-grey; specific gravity 17.5; very infusible; oxidizable in the air by heat, and afterwards acidifiable. Oxide yellow, pulverulent, colouring glass of a blue or brown colour; and a white harsh powder; specific gravity 6.12.

194. *Arsenic.* Grey plates of a lively brightness; friable; specific gravity between 8.310 and 5.703; vaporizable at 540°;

emitting a smell like garlic; crystallizable; oxidizable in the cold air; inflammable at a red heat, and sublimed in the form of the white oxide or acid; farther oxidizable by the nitric and nitrous acids; combines with phosphorus, sulphur, and many of the metals; soluble in hydrogen gas. *Officinal.*

195. *Columbium* has hitherto been examined only in the state of columbic acid, which is a white powder insoluble in water

ACIDS WITH SIMPLE BASES, AND THEIR COMPOUNDS.

196. The simple substances, in their extreme states of oxygenizement, constitute a strongly marked class of bodies termed *Acids*, which are distinguished by the following properties:

a. Their taste is sour;

b. They change vegetable blues to red;

c. They combine with water in almost any proportion, without suffering any change in their properties, except what depend on dilution.

d. They unite with alkalies, earths, metallic oxides; forming compounds with them, possessed of new properties, and commonly known by the names of Neutral and Metallic Salts.

197. Besides some of the metals, hydrogen is the only simple substance which does not seem to be capable of acidification; and, on the other hand, there are three acids, the muriatic, boracic, and fluoric, which have resisted all attempts to decompose them.

198. *Carbonic acid gas* is transparent, colourless, without smell, irrespirable, and incapable of supporting inflammation; its specific gravity is 0.0018. Water absorbs an equal bulk of it at 41°, acquiring a specific gravity of 1.0015, and an agreeable acidity and sparkling appearance, especially if heated to 88°. It is separated from water by freezing or boiling. It is also absorbed by alcohol, oil of turpentine, and olive oil. It contains 28 carbon, and 72 oxygen. Its compounds are denominated Carbonates. *Officinal.*

199. The *carbonates* always preserve their alkaline properties in some slight degree. They are decomposed by all the acids, forming a brisk effervescence, which is colourless. The carbonates of the metals very much resemble their oxides. *Officinal.* Carbonates of baryta, of lime, of magnesia, of potass, of soda, of ammonia, of zinc, of iron.

200. *Nitrous acid* is of a brown or red colour, exceedingly volatile, and emitting an intolerable and suffocating odour. By the addition of water, its colour is successively changed to blue, green, and yellow. In the state of vapour, it is absorbed by water, oil, and sulphuric acid. It consists of about 70 parts of oxy-

gen, and 30 of nitrogen, or rather of nitric acid and nitric oxide. It forms nitrites. *Officinal.*

201. The *nitrites* are characterized by their emitting the nitrous acid in orange fumes, on the addition of sulphuric acid.

202. *Nitric acid* consists of nitrogen combined with oxygen: It is liquid, colourless, and transparent. It is very corrosive, and tinges the skin of a yellow colour. It has a strong affinity for water, and absorbs it from the atmosphere. When most concentrated, its specific gravity is 1.504. It produces heat when mixed with water. It is decomposed by many substances. Light converts it in part into nitrous acid. When entirely deprived of water, it sets fire to oils, to sulphuretted hydrogen gas, to iron filings, when perfectly dry; and to zinc, bismuth, and tin, when poured on them in a state of fusion. It oxygenizes all the metals, except gold, platinum, and titanium. It consists of 70.50, by weight, of oxygen, and 29.50 of nitrogen. *Officinal.*

203. The *nitrates*, by the action of fire, furnish impure oxygen gas, mixed with nitrogen, and are reduced to their basis. By the action of concentrated sulphuric acid, they emit a white vapour; and they are capable of supporting combustion. *Officinal:* Nitrates of potass and of silver.

204. *Sulphurous acid gas* is colourless, incapable of maintaining combustion, and deleterious when respired. It has a strong suffocating odour; its specific gravity is 0.00246, or 0.00251. Water at 54° rapidly absorbs one eleventh of its weight of this gas, and when saturated, acquires the specific gravity of 1.040. It is again expelled from the water by heat, but not by freezing. It is also absorbed by sulphuric acid, to which it imparts the property of crystallizing, forming what is called Glacial sulphuric acid. When water is present, it is converted by oxygen gas into sulphuric acid. It is decomposed by hydrogen, carbon, and sulphuretted hydrogen gas, when assisted by heat. It oxidizes iron, zinc, and manganese. It consists of 85 sulphur, and 15 oxygen.

205. The *sulphites*, by the action of heat, furnish sulphur, and become sulphates. They are also converted into sulphates, with effervescence, and exhalation of sulphurous vapours, by the sulphuric, nitric, muriatic, and other acids, and gradually, by exposure to the atmosphere when dry, and very quickly when dissolved. *Officinal:* Sulphate of potass with sulphur.

206. *Sulphuric acid* is also composed of sulphur and oxygen. It may be obtained in a crystallized or glacial form, but generally exists as a dense liquid; specific gravity 1.85; slightly viscid; transparent and colourless; without smell; of a strong acid taste. It freezes at —36°, and boils at 590°. It has a strong attraction for water, absorbing it rapidly from the atmosphere, and producing considerable heat when mixed with it.

It is decomposed by most inflammable substances. It does not oxidize gold, platinum, tungsten, or titanium. It decomposes the alkaline and earthy sulphurets, and reduces all organic substances to charcoal. In medicine it is a powerful refrigerant and antiseptic. It contains 56 sulphur, and 44 oxygen. *Officinal.*

207. The *sulphates* form sulphurets, when heated to redness with charcoal, and furnish copious precipitates with solutions of baryta. *Officinal:* Sulphates of baryta, potass, soda, zinc, copper, iron, mercury.

208. *Phosphorous acid* is a white fluid, of an oily appearance. It has a fetid odour, and disagreeable taste; and gives out a thick white smoke and vivid flame when strongly heated. It is decomposed by ignited charcoal The proportions of phosphorus and oxygen have not been ascertained.

209. The *phosphites* are fusible, and, when heated in close vessels, furnish a little phosphorus, and become phosphates. When heated in the open air, they emit a phosphorescent light, and often flashes of flame, accompanied by a strong smell of garlic, and a thick white vapour, and are converted into phosphates.

210. *Phosphoric acid* is also composed of phosphorus and oxygen. It is crystallizable, fusible, and vitrescent. Its specific gravity is 2.687. It readily attracts moisture from the atmosphere, and then its specific gravity becomes 1.417. Its mixture with water produces little increase of temperature. It is decomposed at a high temperature by hydrogen and carbon, and by several of the metals. It consists of 40 phosphorus and 60 oxygen.

211. The *phosphates* are crystallizable, fixed, fusible, vitrifiable, and phosphorescent. They are not decomposed by charcoal. They are soluble in nitric acid, without effervescence, and precipitable from that solution by lime-water. *Officinal:* Phosphate of soda.

METALLIC ACIDS AND THEIR COMPOUNDS.

212. *Arsenous acid* is of a white colour; has a sharp acrid taste, and an alliaceous smell; specific gravity 3.706; is soluble in 80 times its weight of water at 60°, and in 15 at 212°. At 283° it sublimes; if heated in close vessels it is vitrified, and its specific gravity becomes 5.000. It consists of 75 of arsenic, and 25 of oxygen; and is a most virulent poison. *Officinal.*

213. The *arsenites* are decomposed by heat, and by all the acids.

214. *Arsenic acid* is not crystallizable; has an acid caustic taste, and is not volatile, but very fixed and vitrifiable. Its specific gravity is 3.391. It attracts moisture from the atmosphere,

and is soluble in two thirds of its weight of water. By a red heat it loses part of its oxygen, and becomes arsenous acid. It consists of 65 arsenic, and 35 oxygen.

215. The *arsenates* are decomposed by charcoal at a high temperature.

216. *Molybdic acid* is a white powder, of an acid but metallic taste. Its specific gravity is 3.4. It is not altered in the air. It is melted, and is fixed, in a covered crucible; but when the cover is removed, it sublimes in a white smoke, which condenses in brilliant yellow scales. It dissolves at 212° in 960 waters. By heat it forms a blue solution in sulphuric acid. It is also soluble in the muriatic, but not in the nitric acid. It consists of 67 metal, and 33 oxygen.

217. The *molybdates* are generally colourless and soluble, and are precipitated light-brown by prussiate of potass.

218. *Chromic acid* is a red or yellow orange powder, of a particular rough, metallic taste. It is soluble in water, and may be obtained in ruby-coloured crystals. It is decomposed by heat and light, passing to the state of green oxide. It is reduced by heat and charcoal. It oxygenizes the muriatic acid.

219. The *chromates* are of a yellow or orange colour.

220. *Columbic acid* is a white powder, which reddens litmus paper, although it seems insoluble in water. It is soluble in boiling sulphuric and muriatic acids, but not in the nitric. It is precipitated from its solutions by water, potass, and soda. With prussiate of potass it forms an olive-green precipitate, and with tincture of galls, a deep orange precipitate. It combines with potass and soda, and expels carbonic acid. It does not unite with ammonia.

221. *Columbate* of potass resembles boracic acid in its appearance.

UNDECOMPOSED ACIDS AND THEIR COMPOUNDS.

222. *Muriatic acid gas* is transparent and colourless. It destroys life, and extinguishes flame. Its specific gravity is 0.002315. Water is capable of dissolving about an equal weight of it. Its specific gravity is then 1.500; it is generally of a pale yellow colour, is very volatile, and emits white fumes of a peculiar unpleasant odour. The gas decomposes alcohol and oil, and destroys putrid exhalations. It is further oxygenized by the nitric acid. *Officinal:* Muriatic acid.

223. The *muriates* have a more or less pure salt taste. They are not acted upon by any combustible body. They are all soluble in water, and are the most volatile and most difficultly decomposed by heat of the neutral salts. They emit white fumes with the sulphuric acid, and oxy-muriatic acid gas with the ni-

tric. *Officinal:* Muriates of soda, ammonia, baryta, lime, mercury, antimony.

224. *Oxygenized muriatic* (or, by contraction, oxy-muriatic) *acid gas* is composed of muriatic acid 84, and oxygen 16. It is of a yellow colour, very pungent smell, and acrid taste. It supports flame, but is deleterious when respired. It destroys the vegetable colours. It parts with oxygen to all oxygenizable substances, and becomes muriatic acid. It is decomposed by light. It does not unite readily with water. Water, when saturated with it, weighs 1.003.

225. The *oxy-muriates* destroy vegetable colours.

226. *Hyper-oxygenized muriatic acid* consists of muriatic acid 35, and oxygen 65. It has not been obtained in a separate state.

227. *Hyper-oxy-muriates* give out very pure oxygen gas by the action of caloric, and become muriates. They do not destroy vegetable colours. Their acid is expelled from them with noise, by the stronger acids; and they inflame combustible bodies, even spontaneously, and with detonation.

228. *Fluoric acid gas* is invisible, irrespirable, and extinguishes flame. It has a pungent smell, approaching to that of muriatic acid. It is heavier than common air. It corrodes the skin. It is absorbed by water. Its most remarkable property is that of dissolving silica.

229. *Fluates* afford, when treated with concentrated sulphuric acid, a vapour which corrodes glass, and from which the silica is afterwards precipitated by water.

230 *Boracic acid* exists in the form of small, shining, laminated crystals. Specific gravity is 1.479. It is fixed and vitrifiable in the fire. It is soluble in fifty parts of boiling water. It is also soluble in alcohol, to which it imparts the property of burning with a yellow flame. It oxidizes only iron and zinc.

231. *Borates* are vitrifiable; and their concentrated solutions afford, when heated with the strong sulphuric acid, brilliant lamellated crystals. *Officinal:* Sub-borate of soda.

OF COMPOUND OXIDES AND ACIDS.

232. We have already noticed all the binary combinations which oxygenizable substances form with oxygen. These in general have considerable permanence in their characters, and admit of few variations in the proportions of their constituent principles. But oxygen is capable of entering into combination at the same time with more than one simple substance, forming oxides and acids, with double or triple bases, which, in consequence of the increased number of principles, are subject to greater variations in their proportions, and are less permanent in their characters. These are, however, the substances with

which pharmacy is chiefly occupied, as they comprehend almost the whole of the vegetable and animal kingdoms Chemists, borrowing their arrangement from natural history, have almost always considered them under the title of Vegetable and of Animal Substances. But such an arrangement is so totally unconnected with the principles of chemistry, that the imperfect state of our knowledge is the only apology that can be offered for its continuance; and limited as that knowledge is, we are persuaded that an attempt at a classification of these bodies, on chemical principles, is to be preferred.

COMPOUND OXIDES.

233. The compound oxides are characterized by their great alterability, and by their affording, when burnt with a sufficient quantity of oxygen, both water and carbonic acid. They may be divided into

a. Ternary oxides, containing various proportions of carbon, hydrogen, and oxygen;

b. Quaternary oxides, consisting of nitrogen, carbon, hydrogen, and oxygen.

234. The ternary oxides coincide nearly with the class of vegetable substances, and are characterized

a. By their being converted entirely into water and carbonic acid gas, when completely decomposed by oxygen;

b. By their undergoing the acid fermentation, from the action of air and water;

c. And by their furnishing nitrous gas and carbonic acid, when treated with nitric acid.

235. The quaternary oxides coincide nearly with animal substances, and are characterized

a. By their furnishing, when decomposed by oxygen, ammonia as well as water and carbonic acid gas;

b. By their becoming putrid from the action of air and water;

c. And by their furnishing nitrogen gas when treated with nitric acid.

TERNARY OXIDES.

236. The ternary oxides may be subdivided into gaseous, fluid, or easily fusible, and solid infusible. In general, the gaseous and volatile compound oxides contain the largest proportion of hydrogen, and the infusible dense oxides the largest proportion of carbon.

237. *Hydro-carbonous oxides* (hydro-carbonates) are invisible elastic gases, of a strong disagreeable smell, irrespirable, and

incapable of supporting combustion, but burning with oxygen with a blue lambent flame, and producing carbonic acid gas and water. From their furnishing charcoal, when decomposed by melted sulphur, and from the products of their combustion, they evidently contain oxygen. There are different species of hydro-carbonates, depending on the proportion of their constituents, which, from their specific gravities, are commonly distinguished into heavy and light hydro-carbonates.

238. The light hydro-carbonous oxides are obtained by the distillation of wet charcoal, or by transmitting the vapours of alcohol through a red-hot tube: specific gravity 0.00059 to 0.00064. The heavy hydro-carbonous oxides are obtained by distillation from camphor, ether, animal and vegetable substances, and by collecting the gas of marshes: specific gravity 0.00080 to 0.00082. The latter contain more carbon, require more oxygen for their decomposition, and furnish a larger proportion of carbonic acid gas, and less water, than the former.

239. *Alcohol* is a transparent colourless liquid, of an agreeable penetrating smell, and pungent burning taste: specific gravity 0.8. It remains fluid in the greatest natural or artificial cold. It boils at 176°, and in vacuum at 56°. Alcohol unites with water in every proportion. During the combination, caloric is evolved, and the specific gravity of the compound is greater than the mean of those of the components. Alcohol dissolves about 60 of sulphur, when they are presented to each other in a state of vapour. It also dissolves a little phosphorus. These solutions are decomposed by water. It dissolves the boracic and carbonic acids, ammonia, soda, and potass, and is the means employed to obtain the two last in a state of purity. Its action on the salts is various. It dissolves the volatile oils, resins, soaps, balsams, camphor, sugar, tannin, cinchonin, extractive, and in part the gummy resins. Alcohol is very inflammable, and when kindled burns entirely away, with a blue flame without smoke. The products of its combustion are carbonic acid and water. It is also decomposed by being transmitted in the state of vapour through a red-hot porcelain tube; by being heated with the fixed alkalies; and by the action of the sulphuric, nitric, oxy-muriatic, and acetic acids. From Lavoisier's experiment on the combustion of alcohol, it was found by calculation to consist of 51.72 oxygen, 29.88 charcoal, and 18.40 hydrogen. *Officinal.*

240. *Ether* is a transparent colourless fluid, of a very fragrant odour, and hot pungent taste: specific gravity 0.758. It freezes and crystallizes at —46°. It boils at 98°, and in vacuum at —20°. It is very soluble in air, and during its evaporation it produces an intense degree of cold. It is soluble in ten parts of water, and in alcohol in every proportion. It dissolves a small portion of phosphorus, and the solution is decomposed by alcohol. It

absorbs nitrous gas, combines with ammonia; and dissolves the volatile oils, resins, and caoutchouc. Ether is extremely inflammable, and burns with a white flame. Its vapour explodes when kindled in contact with oxygen gas. It is decomposed by sulphuric acid, oxy-muratic acid gas, and by being transmitted through a red-hot porcelain tube. Its constituents are oxygen, carbon, and hydrogen; the proportions not ascertained. *Officinal.*

241. *Fixed Oils* are transparent, more or less coloured, somewhat viscid, inodorous fluids, having a mild-taste and unctuous feel. In the different species the specific gravity varies from 0,9403 to 0.9153. The point of congelation also differs considerably, but in general it is within the range of the ordinary temperatures of the atmosphere. Their boiling point exceeds 600°; and by being converted into vapour, they become empyreumatic. Fixed oils do not seem capable of combining with charcoal, but are freed from impurities by being filtered through hot charcoal. When assisted by heat, they dissolve sulphur and phosphorus. They may be blended with sugar and gum by trituration, as in emulsions, and they dissolve the volatile oils, resins, and gummy resins. With the alkalies and earths they form soaps, and with metallic oxides plasters. They are not soluble in water or in alcohol. They unite readily with oxygen, which renders them concrescible. Those oils which dry without losing their transparency, as linseed oil, are termed drying oils, in contradistinction to the fat oils, which from exposure become white, opaque, and thick, and remain greasy, such as oil of olives or of almonds. When they become rancid, they undergo a farther degree of decomposition, and are found to contain sebacic acid. Oil in the state of vapour is inflammable, and burns with a white flame. When the combustion is complete, the products are carbonic acid gas and water, but in general soot is also deposited. The sulphuric acid renders the fixed oils brown and thick, and converts them into water and charcoal. The nitric acid oxygenizes them. The oxygenized muriatic acid blanches them, and renders them concrete, like tallow or wax. The oils oxidize several of the metals, and are oxidized by several of their oxides. From Lavoisier's experiment on the combustion of olive oil, its constituent principles were estimated at 79 charcoal and 21 hydrogen. *Officinal:* Oil of almonds, linseed, mustard, castor oil, and cocoa butter.

242. *Fat* and *tallow* scarcely differ from the fixed oils, except in being more concrete and more disposed to rancidity. Fat melts between 92° and 127°. Tallow is still less fusible. They cannot be converted into vapour without suffering decomposition, and, when melted, leave, like oil, a greasy stain on paper. *Officinal:* Mutton suet, axunge.

243. *Wax* is a solid of considerable consistence, granulated and

crystalline in its fracture, of a white colour, and without any remarkable odour or taste. It softens and becomes plastic when very slightly heated; at 142° it melts; at a higher temperature it is in part vaporized and decomposed, and its vapour is inflammable. It resists in a remarkable degree the action of the acids; but in most of its other properties it resembles the fixed oils. From its combustion it appears to consist of carbon 53.12, hydrogen 16.91, and oxygen 29.97. *Officinal.*

244. *Spermaceti* may be obtained crystallized in white argentine plates, of an unctuous feel and taste, and a vapid smell. It melts between 90° and 95°, and at a higher temperature may be sublimed almost unchanged Its vapour is inflammable, and its flame is bright, clear, and without smell. By exposure to air it becomes rancid. It is soluble, especially by the assistance of heat, in alcohol and in ether. In its other properties it agrees with the fixed oils, with which it unites very readily by fusion. Muscular flesh, by long maceration in water, is converted into a substance very analogous to spermaceti, but more fusible, melting at 82°; and biliary calculi often consist of another, which is much less fusible, requiring a heat of 192° for its fusion. For all these varieties, Fourcroy has proposed the generic name *Adipocere. Officinal.* Spermaceti.

245. *Soaps* are combinations of the fluid or concrete fixed oils with alkalies, earths, or metallic oxides. The alkaline soaps have an unpleasant taste and peculiar smell, form a milky solution with water, and a transparent one with alcohol, and are powerfully detergent. White soap is made of soda and olive oil or tallow. Brown soap contains also resin. Soft soap consists of potass and whale oil: the white spots in it are from the addition of a little tallow. The volatile liniment of the pharmacopœias is a soap of ammonia and olive oil. The alkaline soaps are decomposed by all the earthy salts. The alkali of the soap combines with the acid of the salts, and an earthy soap is formed from the union of the earth and oil. The earthy soaps are insoluble in water. The alkaline soaps are decomposed in the same way by the metallic salts. The metallic soaps are also insoluble in water; many of them are soluble in oil, and some of them in alcohol. *Officinal.* Soaps of soda and ammonia.

246. *Plasters* are also combinations of oil with metallic oxides. They are prepared by their immediate action on each other. Olive oil and litharge are most commonly employed. *Officinal.* Litharge plaster.

247. *Volatile oils* differ from the fixed oils most remarkably in being vaporized unchanged by a heat under 212°; by evaporating completely, without leaving a stain on paper; by being sapid, often pungent and odorous; and by being soluble in alcohol, and to a certain degree in water. They are more inflammable

than the fixed oils, and burn with a large white flame, emit a great deal of smoke, and require more oxygen for their combustion. By exposure to the air they become coloured and thick, and are at last converted into an almost inodorous resin. They are also oxidized and converted into resins by muriate of mercury and muriate of antimony; the acids act on them with great violence, and are even capable of inflaming them. On the other hand, they resist considerably the action of the alkalies. In their other general properties they agree with the fixed oils, from which they seem to differ in composition, only in containing a larger proportion of hydrogen. In other respects, these oils are infinitely varied, especially in their taste and odour. Some are as limpid as water, others are viscid, others congeal on a slight diminution of temperature, and are even naturally concrete, and others are capable of forming crystallizations. Their predominant colours are the different shades of yellow and red, but there are also blue, green, and glaucous essential oils. Their specific gravity varies from 0.8697 to 1.0439. *Officinal:* Oil of anise, cajeput, caraway, fennel, juniper, lavender, mace, origanum, pennyroyal, peppermint, pimento, rosemary, rue, sassafras, savin, spearmint, turpentine, cloves, and all aromatic or odorous substances. *Empyreumatic oils*: Oil of amber, of hartshorn, of petroleum.

248. *Guaiac* differs from the resins in being soluble in nitric acid without the assistance of heat, and forming oxalic acid instead of tannin; in nitric and oxy-muriatic acid, changing the colour of its solutions to green, blue, and brown, successively, and in affording a larger quantity of charcoal.

249. *Resins* are concrete substances, possessing a certain degree of transparency, and generally of an amber or brownish red colour. Their texture is homogeneous, and their fracture vitreous. They are easily reduced to powder, which readily agglutinates. Their specific gravity varies from 1.0452 to 1.2289. They have little taste or smell. They are electrics. Exposed to a certain degree of heat, they melt without suffering alteration, but they are decomposed when converted into vapour. Their vapour is inflammable, and burns with a large strong flame and a great deal of soot. Resins unite by fusion with sulphur, difficultly with phosphorus. They are soluble in alcohol, the fixed and the volatile oils, and alkalies, and in nitric acid with evolution of nitric oxide gas. They are insoluble in water, and are not acted upon by metallic oxides. *Officinal*: Pine resins, dragons blood, guaiac, balsams of Peru, Tolu, Gilead, and Canada, turpentine, benzoin, storax, olibanum, tacamahac, mastiche, sandarac, elemi.

Amber, copal, and about one fifth of sandarac, differ from the resins in not being soluble in alcohol without peculiar management.

250. *Camphor* is a concrete friable substance, of a white colour, with a considerable degree of transparency, and a crystalline appearance, specific gravity 0.9887. Its taste is bitter and acrid, and its smell penetrating and peculiar. It is evaporated unchanged by a heat of 145°, but may be melted by suddenly exposing it to 302°. The vapour when condensed crystallizes in hexagonal plates. Its vapour is exceedingly inflammable, and when kindled, burns with a very white flame and a great deal of smoke, leaving no residuum. The products of its combustion are carbonic acid gas, charcoal, and water. Camphor is soluble in alcohol and in the acids. From these solutions it is precipitated by water. It is also soluble in hot oils, both volatile and fixed, but on cooling separates from them in plumose crystals. It is insoluble in water, and is not acted on by the alkalies, metals, or metallic oxides. By repeated distillation with nitric acid it is converted into camphoric acid. It exists in many vegetables, but is chiefly procured from the *laurus camphora*. *Officinal.*

251. *Starch* is a fine white powder, generally concreted in friable hexagonal columns, smooth to the feel, and emitting a particular sound when compressed. It has neither taste nor smell. It is decomposed by heat. It is not soluble in cold water or in alcohol. Warm water converts it into a kind of mucilage, which on cooling assumes a gelatinous consistence. This jelly, when dried by heat, becomes transparent and brittle like gum, but is not soluble in cold water. Starch, after being thus dissolved in hot water, cannot be reduced to its original state. It is precipitated by infusion of galls, and the precipitate is re-dissolved on heating the mixture to 120°, but is not soluble in alcohol. *Officinal:* Wheat, starch, flour, barley, oats.

252. *Asparagin* crystallizes in white, transparent, hard, brittle, rhomboidal prisms; taste cool and nauseous; readily soluble in hot water, sparingly in cold, and insoluble in alcohol. Solution does not affect vegetable blues, infusion of nutgalls, acetate of lead, oxalate of ammonia, muriate of barytes, or hydro-sulphuret of potass. Potass disengages no ammonia, but renders it more soluble in water. It dissolves in nitric acid, forming a solution of a yellow colour and bitter taste. It has hitherto been found only in the expressed juice of asparagus.

253. *Inulin* is a white powder, insoluble in cold, but readily soluble in hot water; insoluble in alcohol; burns with the smell of caromel, and yields oxalic acid, when treated with nitric acid.

254. *Sugar* is a hard, but brittle substance, of a white colour, disposed to form semi-transparent crystallizations, of a sweet taste,

and without smell. When heated sufficiently it melts, is decomposed, emits a peculiar smell (caromel), and becomes inflamed. Sugar at 40° is soluble in its own weight of water, and in still less at 212°. It is also soluble in about four parts of boiling alcohol. It combines with volatile oils, and renders them miscible with water. It also unites with potass and lime. It is decomposed by the concentrated sulphuric and nitric acids. According to Lavoisier's and Dr. Thomson's experiments, it consistsof about 64 oxygen, 28 charcoal, and 8 hydrogen. *Officinal:* Sugar, honey, manna.

255. *Sarcocoll* (Dr. Thomson) does not crystallize; soluble in water and alcohol. Taste bitter sweet. Soluble in nitric acid, and yields oxalic acid. *Officinal*: Sarcocoll, extract of liquorice.

256. *Jelly* is contained in the juices of acid fruits. It is deposited from them in the form of a soft tremulous mass, almost colourless, and agreeable to the taste. It is scarcely soluble in cold water, but very soluble in hot water; and when the solution cools, it again assumes a gelatinous state. With sugar its combination is well known. By long boiling it loses this property of congealing. When dried, it becomes transparent, hard, and brittle, resembling gum. It combines with the alkalies, and is converted by the nitric acid into oxalic acid. *Officinal*: Acidulous fruits.

257. *Tannin*, when completely dried, is a brittle substance, of a black colour, and vitreous fracture; it is soluble in alcohol; it is much more soluble in hot than in cold water. The solution has a dark-brown colour, astringent taste, and peculiar smell; it is precipitated by acids, in the form of a viscid fluid, like pitch; it is also precipitated by carbonate of potass in yellow flakes; it forms an insoluble elastic precipitate with gelatin, and dark blue or black precipitates with iron. Mr. Hatchett has lately prepared a species of tannin artificially, by the action of nitrous acid on charcoal, and various substances containing charcoal. *Officinal:* Galls, uva ursi, tormentil, rhubarb, sarsaparilla, St. Lucie cinchona, swietenia, simarouba, filix mas, kino, catechu, salix.

QUATERNARY OXIDES.

258. *Gum*, when pure, is transparent and colourless, easily reduced to powder, without smell, and of a slightly sweetish taste. The solution of gum in water constitutes mucilage; it is thick and adhesive, and soon dries when exposed to the air. Gum is also soluble in the weak acids; but is totally insoluble in alcohol, which even precipitates it from mucilage. When triturated

with a small quantity of oil or resin, it renders them miscible with water. Gum is very little disposed to spontaneous decomposition: even mucilage may be kept for many years without change; but it is decomposed by the strong acids. By oxygenizement with nitric acid, it forms successively mucous, malic, and oxalic acid; with oxy-muriatic acid it forms citric acid. When exposed to heat, it does not melt, but softens, swells, and becomes charred and incinerated. Its products are carbonic acid, and carburetted hydrogen gas, empyreumatic oil, and a considerable quantity of acetous acid, combined with a little ammonia. Fourcroy and Vauquelin say it consists of 65.38 oxygen, 23.08 carbon, and 11.54 hydrogen. Cruickshanks has however demonstrated, that it contains nitrogen and lime; and has rendered it probable that it differs from sugar, in containing more carbon and less oxygen. *Officinal*: Gum arabic, linseed, quince-seed.

259. *Tragacanth* is opaque and white, difficultly pulverizable, not sweetish, is very sparingly soluble in water, but absorbs a large proportion, and forms a paste. Its solution is adhesive, but cannot be drawn out into threads. It moulds readily, and acquires a fetid smell. It is precipitated by nitrate of mercury. It is insoluble in alcohol; and seems to contain more nitrogen and lime than gum does. *Officinal*: Tragacanth.

260. *Ulmin*, a solid, hard, black substance, with considerable lustre; when reduced to powder, brown; insipid, but readily soluble in the mouth; soluble in a small quantity of water; solution transparent, blackish brown, not mucilaginous or adhesive; insoluble in alcohol or ether; convertible into resin by nitric or oxy-muriatic acid. Hitherto examined only by Klaproth, and supposed to be a product of the *ulmus nigra*.

261. *Extractive* is soluble in water, especially when hot, and in alcohol; it is also soluble in the weak acids, but is insoluble in ether. It attracts moisture from the atmosphere; and when dissolved in water, it absorbs oxygen, and becomes insoluble in water: it is also altered and precipitated by oxy-muriatic acid; it has a strong affinity for alumina, and decomposes several metallic salts. It is found in almost all plants, but can scarcely be procured separate, so that its characters are not well ascertained. *Officinal*: Saffron, aloes.

262. *Gum-resins*, in strict propriety, should not be noticed here, as they are secondary compounds, and probably vary much in their nature. They seem to be compounds of resin with extractive and essential oil, and perhaps other immediate principles not yet ascertained. *Officinal*: Gum ammoniac, galbanum, scammony, assafœtida, gamboge, myrrh, sagapenum, olibanum.

263. *Bitter principle* (Thomson), intensely bitter, of a yel-

lowish colour, ductile while soft, brittle while dry, not fusible, soluble in alcohol and water, not crystallizable, precipitated by nitrate of silver, acetate of lead. *Officinal*: Quassia, gentian, colocynth, broom, simarouba, dandelion, colomba, marsh trefoil, lesser centaury, blessed thistle, different species of artemisia, cinchona Jamaicensis.

264. *Narcotic principle*, crystallizable, soluble in about 400 parts of boiling water, soluble in cold water, soluble in 24 parts of boiling alcohol, soluble in hot ether, in all acids, and in hot volatile oils, fusible, not volatile, highly narcotic. *Officinal*: Opium, lactuca, belladonna, hyosciamus, hemlock, stramonium.

265. *Acrid principle*, soluble in alcohol, water, acids, and alkalies, rises in distillation with water and alcohol, not neutralized by alkalies or acids. *Officinal*: Squills, garlic, colchicum, asarum, arum, hellebore, bryony, iris, ranunculus, digitalis, viola, scurvygrass, mustard.

266. *Cinchonin*, not acrid, soluble in alcohol and in water, precipitated by infusion of galls; precipitate soluble in alcohol. *Officinal*: Cinchona officinalis, colomba, angustura, ipecacuan, piper, opium, capsicum.

267. *Indigo* has a deep blue colour, is light and friable, without taste or smell, insoluble in water, alcohol, ether, and oils, forming a deep blue solution with sulphuric acid when precipitated from acids; soluble in alkalies, becoming green. It is obtained from the indigofera tinctoria and isatis tinctoria.

268. *Caoutchouc*, when smoke has not been employed in drying it, is of a white colour, soft, pliable, extremely elastic, and difficultly torn; specific gravity 0.9335; inalterable by exposure to air; insoluble in water, but softened, so that its edges may be made to adhere to each other; insoluble in alcohol; soluble, without alteration, in ether previously agitated with water, and in rectified petroleum; soluble in volatile oils; and fusible by heat, but altered, so that it remains glutinous after evaporation and cooling; inflammable; insoluble in alkalies; and decomposed by the strong acids. It is obtained principally from Hævea caoutchouc and Jatropha elastica in South America, and the Ficus Indica, Artocarpus integrifolia, and Urceola elastica in the East Indies.

269. *Bird-lime* is a green, gluey, stringy, and tenacious substance, insoluble in water and in cold alcohol; unites readily with the oils, and is soluble in ether, forming a green solution.

270. *Suber* constitutes the epidermis of all vegetables. On the Quercus suber it is thickened by art in a surprising degree, and forms common cork. It is a light elastic substance, very inflammable, burning with a bright white flame, and leaving a very spongy charcoal; it is not soluble in any menstruum; it is

decomposed by nitric acid, and is converted into a peculiar acid, and an unctuous substance.

271. *Wood* (Lignin ?), when separated from all the other matters with which it is combined in vegetables, is a pulverulent, fibrous, or lamellated body, more or less coloured, of considerable weight, without taste or smell, and insoluble in water or alcohol. When exposed to sufficient heat, it is decomposed without melting or swelling, and is converted into charcoal without any change of form. Its products, by combustion, are carbonic acid, and carburetted hydrogen gas, water, empyreumatic oil, and acetous acid. By nitric acid, it is changed into the malic, oxalic, and acetous acids. It forms the skeleton of all vegetables.

272. *Cotton*, a white fibrous substance, without smell or taste, insoluble in water, alcohol, ether, oils, and vegetable acids; soluble in strong alkaline leys, and when assisted by heat, in nitric acid, forming oxalic acid.

273. *Gelatin*, when exsiccated, is a hard, elastic, semi-transparent substance, resembling horn, having a vitreous fracture: inalterable in the air, soluble in boiling water, and forming with it a gelatinous mass on cooling; it is also soluble, but less readily, in cold water. It is soluble in acids, even when much diluted, and also in the alkalies. It is precipitated by tannin, with which it forms a thick, yellow precipitate, soon concreting into an adhesive, elastic mass, readily drying in the air, and forming a brittle substance, of a resinous appearance, resembling over-tanned leather, very soluble in ammonia, and soluble in boiling water. It is also precipitated copiously by carbonate of potass, and by alcohol; both precipitates being soluble in water. The solution of gelatin in water first becomes acid, and afterwards putrid. When decomposed by nitric acid or heat, its products shew that it contains only a small proportion of nitrogen. It is principally contained in the cellular, membraneous, and tendinous parts of animals, and forms an important article of nourishment. Glue and isinglass, which are much employed in the arts, are almost pure gelatin. *Officinal:* Isinglass, cornu cervi.

274. *Albumen*, when dried, is a brittle, transparent substance, of a pale yellow colour, and glutinous taste, without smell, readily soluble in cold water, insoluble in boiling water, but softened and rendered opaque and white when thrown into it; insoluble, and retaining its transparency in alcohol; swelling; becoming brown, and decrepitating when suddenly exposed to heat. It generally exists in the form of a viscid, transparent fluid, having little taste or smell, and readily soluble in cold water. When heated to 165°, it coagulates into a white opaque mass, of considerable consistency; it is also coagulated by alco-

hol and acids, and remarkably by muriate of mercury. Albumen forms with tannin a yellow precipitate, insoluble in water. *Coagulated albumen* is not soluble either in cold or in boiling water. It is soluble, but with decomposition, in the alkalies and alkaline earths. It is also soluble in the acids, greatly diluted, but may be precipitated from them by tannin. When decomposed by nitric acid or heat, it is found to contain more nitrogen than gelatin does. White of egg consists of albumen, combined with a very little soda, sulphur, and phosphate of lime. Albumen also forms a large proportion of the serum of the blood, and is found in the sap of vegetables. It is highly nutricious. *Officinal:* White of egg.

275. *Fibrin* is of a white colour, without taste or smell, tough and elastic; but when dried, hard and almost brittle. It is not soluble in water or in alcohol. The concentrated caustic alkalies form with it a kind of fluid viscid soap. It is dissolved even by the weak and diluted acids; but it undergoes some change, by which it acquires the properties of jellying, and being soluble in hot water. By maceration in water, it becomes putrid, and is converted into adipocere. By long boiling in water, it is rendered tough and corneous. When decomposed by heat or nitric acid, it is found to contain a large proportion of nitrogen. It forms the basis of the muscular fibre, and is contained in small quantity in the blood. The gluten of wheat does not seem to differ from it in any important property. It is eminently nutricious.

276. *Urea* is obtained in the form of brilliant micaceous crystals, in groups, forming a mass of a yellowish white colour, adhering to the vessel containing it; difficult to cut or break; hard and granulated in its centre, gradually becoming soft, and of the consistency of honey on its surface; of a strong, disgusting, alliaceous odour; of an acrid, pungent, disagreeable taste. It is deliquescent; and during its solution in water, it causes a sensible diminution of temperature; it is also soluble in alcohol, especially when assisted by heat. On cooling, the alcoholic solution deposits crystals of pure urea. By the application of heat, it melts, swells rapidly, and at the same time begins to be decomposed, emitting an insupportably fetid odour, and is converted into carbonate of ammonia, and carburetted hydrogen gas. Urea is charred by concentrated sulphuric acid; diluted sulphuric acid, aided by heat, is capable of converting it entirely into acetous acid and ammonia; concentrated nitrous acid decomposes it with rapidity: diluted nitric acid, aided by heat, changes it almost entirely into carbonic acid gas and nitrogen gas; muriatic acid dissolves and preserves it; oxy-muriatic acid converts it into ammonia and carbonic acid; potass, aided by heat,

converts it into the carbonate and acetate of ammonia. It influences the form of the crystallization of the muriates of ammonia and soda. The solution of urea in water varies in colour from a deep brown to pale yellow, according to its quantity. With eight parts of water it is perfectly fluid; it scarcely undergoes spontaneous decomposition when pure, but the addition of some albumen occasions it to putrefy rapidly. By repeated distillation it is entirely converted into carbonate of ammonia. With nitric acid it forms a pearly crystalline precipitate; it also forms precipitates with the nitrates of lead, mercury, and silver. It is not precipitated by tannin or gallic acid. Urea is only obtained from urine by evaporating the solution of a thick extract of urine in alcohol.

COMPOUND ACIDS.

277. The compound acids possess the properties of acids in general; but they are distinguished from the acids with simple bases, by their great alterability.

278. The ternary acids coincide nearly with the vegetable acids, and are characterized by their being converted entirely into water and carbonic acid, when completely decomposed by oxygen. They consist of various proportions of carbon, hydrogen, and oxygen.

279. The quaternary acids coincide nearly with the animal acids; and are characterized by their furnishing ammonia, as well as water and carbonic acid, when decomposed.

TERNARY ACIDS.

280. *Acetic acid* is a transparent and colourless fluid, of an extremely pungent smell and a caustic acid taste, capable of reddening and blistering the skin. It is very volatile, and its vapour is highly inflammable; it combines with water in every proportion; it combines with sugar, mucilage, volatile oils, alcohol; it dissolves boracic acid, and absorbs carbonic acid gas; it is formed by the acidification of sugar, and by the decomposition of some other ternary and quaternary compounds by heat or acids. It is decomposed by the sulphuric and nitric acids, and by heat. The proportions of its constituents are not ascertained. In its ordinary state, it has only an acid taste, a pleasant odour, specific gravity 1.0005, congeals and crystallizes at —22°, and is vaporized at 212°. *Officinal.*

281. *Acetates* are very soluble in water; are decomposed by heat, by exposure of their solutions to the air, and by the stronger acids. *Officinal:* Acetate of potass, lead, zinc, mercury.

282. *Formic acid* is in most respects analogous to acetous acid, but has a peculiar smell, and greater specific gravity, being 1.102 to 1.113.

283. *Oxalic acid* is obtained in prismatic crystals, transparent and colourless, of a very acid taste, soluble in their own weight of water at 212°, and in about two waters at at 65°. Boiling alcohol dissolves somewhat more than half its weight, and at an ordinary temperature a little more than one third. It is soluble in the muriatic and acetous acids. It is decomposed by heat, sulphuric acid, and nitric acid. According to Thomson, it consists of 64 oxygen, 32 carbon, and 4 hydrogen.

284. *Oxalates* are decomposed by heat; form, with limewater, a white precipitate, which, after being exposed to a red heat, is soluble in acetic acid. The earthy oxalates are very sparingly soluble in water; the alkaline oxalates are capable of combining with excess of acid, and become less soluble.

285. *Mellitic acid* crystallizes in very fine needles, or small short prisms, of a brownish colour, and a sweetish sour, but afterwards bitterish, taste; sparingly soluble in water, and decomposed by heat, but not convertible into oxalic acid by nitric acid.

286. *Mellates,* crystallizable.

287. *Tartaric acid* varies in the forms of its crystals; its specific gravity is 1.5962; it is permanent in the air; it is decomposed by heat; it dissolves readily in water, and the solution, when very weak, is decomposed by the atmosphere; it may be changed by nitric acid into oxalic acid. According to Fourcroy, it consists of 70.5 oxygen, 19.0 carbon, and 10.5 hydrogen, *Officinal:* Exists in tamarinds, grapes, &c.

288. *Tartrates,* by a red heat, are converted into carbonates. The earthy tartrates are scarcely soluble in water: the alkaline tartrates are soluble; but when combined with excess of acid, they become much less soluble. The tartaric acid is capable of combining at the same time with two bases. *Officinal:* Supertartrate of potass, tartrate of potass and soda.

289. *Citric acid* crystallizes in rhomboidal prisms, which suffer no change from exposure to the air, and have an exceedingly acid taste. When sufficiently heated, they melt, swell, and emit fumes, and are partly sublimed unchanged, and partly decomposed. Water, at ordinary temperatures, dissolves one half of its weight of these crystals; at 212° twice its weight. The solution undergoes spontaneous decomposition very slowly. Sulphuric acid chars it, and forms vinegar. Nitric acid converts it into oxalic and acetic acids. *Officinal:* Orange and lemon juice, heps, &c.

290 *Citrates* are decomposed by the stronger mineral acids,

and also by the oxalic and tartaric, which form an insoluble precipitate in their solutions. The alkaline citrates are decomposed by a solution of barytes.

291. *Malic acid* is a viscid fluid, incapable of crystallization, of a reddish brown colour, and very acid taste. It exists in the juice of apples, and, combined with lime, in that of the common house-leek. It forms precipitates in the solution of the nitrates of mercury, lead, and silver. *Officinal:* Barberry, plumb, sloe, elder, &c.

292. *Malates* having alkalies for their base, are deliquescent. The acidulous malate of lime is soluble in cold water.

293 *Gallic acid* crystallizes in brilliant colourless plates, of an acid and somewhat austere taste, and of a peculiar odour when heated. It may be sublimed undecomposed, by a gentle heat. It is not altered by exposure to the air, is soluble in 1½ of water at 212°, and in 12 waters at 60°, and in four times its weight of alcohol. It has a strong affinity for metallic oxides, especially those of iron. It precipitates gold, copper, and silver brown, mercury orange, iron black, bismuth yellow, and lead white. *Officinal:* It exists in nut-galls, and in most astringent vegetable substances.

294. *Gallates* have not been particularly examined.

295. *Mucic acid* is a white gritty powder, of a slightly acid taste, soluble in 80 times its weight of boiling water.

296. *Mucates* of potass and soda are crystallizable. Mucates with earthy and metallic bases are nearly insoluble.

297. *Benzoic acid* crystallizes in compressed prisms of a pungent taste and aromatic smell. It is fusible, and evaporates by heat, for the most part, without change. It is also inflammable, and burns entirely away. It is permanent in the air. It is very sparingly soluble in cold water; but at 212° it dissolves in about 24 waters. It is also soluble in hot acetic acid. It is soluble, without change, in alcohol, in concentrated sulphuric and nitric acids, and is separated from them by water. *Officinal:* In balsam of Tolu, of Peru, benzoin, storax, &c.

298. *Benzoates*, little known, but generally forming feather-shaped crystals, and soluble in water.

299. *Succinic acid* crystallizes in transparent white triangular prisms; may be melted and sublimed, but suffers partial decomposition; more soluble in hot than in cold water; soluble in hot alcohol.

300. *Succinates* little known.

301. *Moroxylic acid* crystallizes in colourless transparent prisms, having the taste of succinic acid, and not altered by exposure to the air; volatile, readily soluble in water and in alcohol.

302. *Moroxylate* of lime, needle-formed crystals, permanent

in the air, soluble in water, and precipitating the solutions of silver, mercury, copper, iron, cobalt, and uranium in nitric acid, and of lead and iron in acetic acid.

303. *Camphoric acid* crystallizes in white parallelopipeds of a slightly acid bitter taste, and smell of saffron, efflorescing in the air; sparingly soluble in cold water; more soluble in hot water; soluble in alchohol, the mineral acids, volatile and unctuous oils; melting and subliming by heat.

304. *Camphorates* have commonly a bitter taste, burn with a blue flame before the blow-pipe, and are decomposed by heat, the acid subliming.

305. *Suberic acid* is not crystallizable, but is obtained either in the form of thin pellicles, or of a powder. At 60° it requires 140 times its weight of water for its solution; at 212° only twice its weight. When heated, it first melts, then becomes pulverulent, and at last sublimes. It changes the blue colour of a solution of indigo in sulphuric acid, of the nitrate of copper, and of the sulphate of copper, to green, and gives a yellow colour to the green sulphate of iron, and to the sulphate of zinc.

306. *Suberates* have in general a bitter taste, and are decomposed by heat.

307. *Laccic acid* is obtained in the form of a reddish liquor, having a slightly bitter saltish taste, and the smell of new bread, by expression from the white lac of Madras; but on evaporation it assumes the form of acicular crystals. It rises in distillation. It decomposes with effervescence the carbonates of lime and soda. It renders the nitrate and muriate of barytes turbid. It assumes a green colour with lime water, and a purplish colour with sulphate of iron; and precipitates sulphuret of lime white, tincture of galls green, acetite of lead reddish, nitrate of mercury whitish, and also tartrite of potass; but this last precipitate is not soluble in potass.

308. *Laccate* of lime bitterish; of soda deliquescent.

309. *Sebacic acid* has no smell, and a slightly acid taste. It is crystallizable, melts like fat, and is not volatile. It is so soluble in hot water as to become solid on refrigeration. It is also very soluble in alcohol. It precipitates the nitrates of lead, silver, and mercury, and the acetates of lead and mercury. It does not precipitate the waters of lime, baryta, or strontia.

310. *Sebates* are soluble salts.

QUATERNARY ACIDS.

311. *Prussic* acid is a colourless fluid, of a strong smell, like that of peach flowers or bitter almonds, and a sweetish pungent taste. It does not redden vegetable blues, and unites difficultly with the alkalies and earths. It is easily decomposed by light,

heat, or oxygenized muriatic acid. It does not act upon the metals, but forms coloured, and generally insoluble combinations with their oxides. It has a great tendency to form triple salts with alkaline and metallic bases. It is obtained from animal substances by the action of heat, nitric acid, fixed alkalies, and putrefaction. *Officinal:* Bitter almonds. Prunus lauro-cerasus.

312. *Prussiates* of alkalies are easily decomposed even by carbonic acid. They form variously coloured precipitates in the solutions of the metallic salts, except those of platinum.

313. *Amnic acid* is obtained in white, brilliant, acicular crystals, of an acid taste, reddening the tincture of turnsole, sparingly soluble in cold water, but somewhat more soluble in hot water. It is soluble in alcohol. It is decomposed by heat.

314. *Amnates.* Very soluble in water, and the acid is precipitated from them in the form of a white crystalline powder, by the other acids.

315. *Uric acid* is obtained in the form of acicular brilliant crystals, of a pale yellow colour, almost insoluble in cold, and very sparingly soluble in boiling water, but becoming very soluble when combined with an excess of potass or soda. It is decomposed at a high temperature, and furnishes carbonate of ammonia, and carbonic acid, with very little oil or water, and leaves a charcoal which contains neither lime nor alkali. It is also decomposed by the nitric and oxygenized muriatic acids.

316. The *urates* are almost insoluble in water. The suburates of soda and potass are very soluble, and the uric acid is precipitated from the solutions even by the carbonic acid.

317. *Rosacic acid*, in many respects analogous to uric acid, but has less tendency to crystallize; is more soluble in hot water, and occasions a violet precipitate in muriate of gold. It is the principal constituent of the lateritious sediment in fevers.

318. *Rosates*, unknown.

CHARACTERS OF SALTS DERIVED FROM THEIR BASES.

CLASS FIRST. *Alkaline salts.* Soluble in water, not precipitated by potass or oxalic acid.

GENUS I. *Potass.* Sapid, bitter, crystallizable, fusible, calcinable, vitrified, or reduced to their base by heat, decomposed in general by baryta, rarely by lime. *Officinal:* Sulphate, nitrate, carbonate, super-tartrate, tartrate, acetate.

G. II. *Soda.* Sapid, bitter, crystallizable, commonly containing much water of crystallization, and therefore efflorescent, and undergoing the watery fusion and exsiccation before they are melted by the fire, decomposed by baryta and potass. *Officinal:* Sulphate, muriate, phosphate, carbonate, tartrate, sub-borate.

G. III. *Ammonia.* Sapid, acrid, very soluble, either sublimed unchanged, or decomposed, losing their base partially or totally by heat, base also expelled by baryta, potass, soda, strontia, and lime. *Officinal:* Muriate, carbonate, acetate, hydro-sulphuret.

CLASS SECOND. *Earthy salts.* Either insoluble in water, or if soluble, precipitated by sulphuric acid and carbonate of potass.

GENUS I. *Baryta.* Generally insoluble in water, and indecomposable by fire, all poisonous and decomposed by the alkaline carbonates. *Officinal:* Sulphate, carbonate, and muriate.

G. II. *Strontia.* Generally insoluble in water, and indecomposable by fire, not poisonous, and decomposed by the alkaline carbonates, potass, soda, and baryta.

G. III. *Lime.* Generally sparingly soluble in water, decomposed by the alkaline carbonates, potass, soda, baryta, and strontia, and by oxalic acid. *Officinal:* Carbonate, muriate, phosphate.

G. IV. *Magnesia.* Generally soluble in water, and bitter; decomposed by baryta, potass, soda, strontia, and partially by ammonia. Magnesian salts, when added to ammoniacal salts, containing the same acid, quickly deposite crystals of a triple ammoniaco-magnesian salt. *Officinal:* Sulphate, carbonate.

G. V. *Glucina.* Taste sweetish; decomposed by all the preceding bases; when recently precipitated by an alkali, soluble in carbonate of ammonia, precipitated by an infusion of nutgalls, and succinate of potass.

G. VI. *Alumina.* Generally soluble in water, taste sweetish and styptic; decomposed by all the preceding bases; when recently precipitated, soluble in the alkalies, and in sulphuric acid, precipitated by hydro-sulphuret of potass. *Officinal:* Supersulphate.

G. VII. *Yttria.* Sweetish styptic taste; decomposed by all the preceding bases; precipitated by prussiate of potass and iron, and by infusion of galls.

G. VIII. *Zirconia.* Taste austere; decomposed by all the preceding bases; precipitate not soluble in the alkalies, and when re-dissolved in muriatic acid, precipitated by hydro-sulphuret of potass, prussiate of potass and iron, and infusion of galls.

G. IX. *Silica.* Forms only one salt with fluoric acid, which is crystallizable, soluble in excess of acid, and in the alkaline fluates.

CLASS THIRD. *Metalline salts.*

1. Soluble in water, precipitated by hydro-sulphuret of potass;
2. Insoluble in water, fusible with borax into a coloured glass, or with charcoal into a metallic button.

GENUS I. *Gold.* Soluble in water, solution yellow, metal precipitated by sulphate of iron, sulphurous acid, and infusion of galls; prussiate of potass and iron gives a yellowish white, and muriate of tin a purplish precipitate.

G. II. *Platinum.* Solution in water brownish, not precipitated by prussiate of potass and iron, or infusion of galls, coloured bright red by muriate of tin, metal precipitated by sulphuretted hydrogen, precipitated orange by prussiate of mercury, and in small red crystals by potass and ammonia.

G. III. *Silver.* Metal precipitated by copper and sulphate of iron. Precipitated white by muriatic acid and the prussiates, black by hydro-sulphuret of potass, and yellowish brown by infusion of galls. *Officinal:* Nitrate.

G. IV. *Copper.* Soluble in water; solution blue or green, rendered bright blue by ammonia, metal precipitated by iron, precipitated black by hydro-sulphuret of potass, greenish yellow by prussiate of potass and iron, and brown by oxalic acid. *Officinal*: Sulphate, ammoniaret.

G. V. *Iron.* Soluble in water. Solution green or brownish red; precipitated blue by the triple prussiates, and purple or black by infusion of galls. *Officinal*: Sulphate, tartrate, acetate, carbonate.

G, VI. *Lead.* Insoluble salts easily reduced. Soluble salts colourless; precipitated white by triple prussiate, infusion of galls and zinc, and black by hydro-sulphuret of potass. *Officinal*: Acetate, sub-acetate.

G. VII. *Tin.* Soluble, not precipitated by infusion of galls; precipitated white by triple prussiate and lead, black by hydro-sulphuret of potass, and brown by sulphuretted hydrogen.

G. VIII. *Zinc.* Soluble; colourless; not precipitated by any metal or infusion of galls; precipitated white by alkalies, triple prussiate, hydro-sulphuret of potass, and sulphuretted hydrogen. *Officinal*: Sulphate.

G. IX. *Mercury.* Volatile; precipitate by copper metallic, by triple prussiate and muriatic acid white, by hydro-sulphuret of potass black, and by infusion of galls orange. *Officinal*: Muriate, sub-muriate, sub-sulphate.

G. X. *Tellurium.* Not precipitated by triple prussiate. Precipitate by zinc black and metallic, by hydro-sulphuret of potass brown, by infusion of galls yellow, and by alkalies white, and soluble when the alkali is added in excess.

G. XI. *Antimony.* Precipitate by iron or zinc black, by hydro-sulphuret of potass orange. *Officinal*: Muriate, phosphate, tartrate.

G. XII. *Bismuth.* Solution colourless. Precipitate by copper metallic, by water and triple prussiate white, by infusion of galls orange, and by hydro-sulphurets black.

G. XIII. *Manganese.* Soluble, not precipitated by gallic acid. Precipitate by alkalies, triple prussiate, and hydro-sulphurets, white.

G. XIV. *Nickel.* Salts soluble; colour green; precipitate by triple prussiate dull green, by hydro-sulphuret black, by infusion of galls greyish white, and by iron, &c. metallic.

G. XV. *Cobalt.* Soluble, reddish, precipitated by alkalies blue or reddish brown, by triple prussiate brown with a shade of blue.

G. XVI. *Uranium.* Soluble, yellow, precipitate by alkalies yellow, by alkaline carbonates white, soluble in excess of alkali, by triple prussiate brownish red, by hydro-sulphuret of potass brownish yellow, and by infusion of galls chocolate.

G. XVII. *Titanium.* Precipitate by alkaline carbonates flaky, white, by triple prussiate and hydro-sulphuret green, and by infusion of galls reddish brown, solution coloured red by tin, and blue by zinc.

G. XVIII. *Chromum.* Precipitate by triple prussiate and hydro-sulphuret green, and by infusion of galls brown.

G. XIX. *Molybdenum.* Solutions blue, precipitate by triple prussiate and tincture of galls brown.

G. XX. *Tungsten.* Unknown.

G. XXI. *Arsenic.* Precipitate by water and triple prussiate white, by hydro-sulphuret of potass yellow.

G. XXII. *Columbium.* Colourless; precipitate by alkaline carbonates and zinc white, by triple prussiate green, by hydro-sulphuret of ammonia chocolate, and by tincture of galls orange.

G. XXIII. *Iridium.* Muriatic and sulphuric solution green, nitric red; precipitate by alkalies green and red.

G. XXIV. *Osmium.* Alkaline solution coloured purple and vivid blue by infusion of galls.

G. XXV. *Rhodium.* Triple salt with soda and muriatic acid, not precipitated by prussiate of potass, muriate or hydro-sulphuret of ammonia, or alkaline carbonates, but by pure alkalies yellow.

G. XXVI. *Palladium.* Acid solutions red; precipitated by prussiate of mercury yellowish white; by prussiate of potass, brown.

G. XXVII. *Tantalium.* Alkaline solutions precipitated by acids white.

G. XXVIII. *Cerium.* Acid solutions precipitated by alkalies white.

SECT II.

PHARMACEUTICAL OPERATIONS.

COLLECTION AND PRESERVATION OF SIMPLES.

319. EACH of the kingdoms of nature furnishes substances which are employed in medicine, either in their natural state, or after they have been prepared by the art of pharmacy.

320. In collecting these, attention must be paid to select such as are most sound and perfect, to separate from them whatever is injured or decayed, and to free them from all foreign matters.

321. Those precautions must be taken which are best fitted for preserving them. They must, in general, be defended from the effects of moisture, too great heat or cold, and confined air.

322. When their activity depends on volatile principles, they must be preserved from the contact of the air as much as possible.

323. As the vegetable kingdom presents us with the greatest number of simples, and the substances belonging to it are the least constant in their properties, and most subject to decay, it becomes necessary to give a few general rules for their collection and preservation.

324. Vegetable matters should be collected in the countries where they are indigenous; and those which grow wild, in dry soils and high situations, fully exposed to the air and sun, are in general to be preferred to those which are cultivated, or which grow in moist, low, shady, or confined places.

325. Roots which are annual, should be collected before they shoot out their stalks or flowers; biennial roots in the harvest of the first, or spring of the second year; perennial roots either in spring before the sap has begun to mount, or in harvest after it has returned.

326. Those which are worm-eaten, except some resinous roots, or which are decayed, are to be rejected. The others are immediately to be cleaned with a brush and cold water, letting them lie in it as short time as possible; and the fibres and little roots, when not essential, are to be cut away.

327. Roots which consist principally of fibres, and have but a small tap, may be immediately dried. If they be juicy, and not aromatic, this may be done by heat, not exceeding 100° of Fahrenheit; but if aromatic, by simply exposing them, and frequently turning them in a current of cold, dry air; if very thick and strong, they are to be split or cut into slices, and strung upon threads; if covered with a tough bark, they may be peeled fresh, and then dried. Farinaceous roots are to be dipt in boiling water before they are dried. Such as lose their virtues by drying, or are directed to be preserved in a fresh state, are to be kept buried in dry sand.

328. No very general rule can be given for the collection of herbs and leaves, some of them acquiring activity from their age, and others, as the mucilaginous leaves, from the same cause, losing the property for which they are officinal. Aromatics are to be collected after the flower-buds are formed; annuals, not aromatic, when they are about to flower, or when in flower; biennials, before they shoot; and perennials, before they flower, especially if their fibres become woody.

329. They are to be gathered in dry weather, after the dew is off them, or in the evening, before it falls, and are to be freed from decayed, or foreign leaves. They are usually tied in bundles, and hung up in a shady, warm, and airy place; or spread upon the floor, and frequently turned. If very juicy, they are laid upon a sieve, and dried by a gentle degree of artificial warmth.

330. Sprouts are collected before the buds open; and stalks are gathered in autumn.

331. Barks and woods are collected in spring or in autumn, when the most active parts of the vegetable are concentrated in them. Spring is preferred for resinous barks, and autumn for the others which are not resinous, but rather gummy. Barks should be taken from young trees, and freed from decayed parts, and all impurities.

332. The same rules are to be followed in collecting woods; which, however, must not be taken from very young trees. Among the resinous woods, the heaviest, which sink in water, are selected. The alburnum is to be rejected.

333. Flowers are to be collected in clear dry weather, before noon, but after the dew is off, either when they are just about to open, or immediately after they have opened. Of some the petals only are preserved, and the colourless claws are even cut away; of others whose calyx is odorous, the whole flower is kept. Flowers which are too small to be pulled singly, are dried with part of the stalk: these are called heads or tops.

334. Flowers are to be dried nearly in the same manner as leaves, but more quickly, and with more attention. As they

must not be exposed to the sun, it is best done by a slight degree of artificial warmth; and in some cases they should be put up in paper bags. When they lose their colour and smell, they are unfit for use.

335. Seeds and fruits, unless when otherwise directed, are to be gathered when ripe, but before they fall spontaneously. The emulsive and farinaceous seeds are to be dried in an airy, cool place; the mucilaginous seeds by the heat of a stove. Some pulpy fruits are freed from their core and seeds, strung upon thread, and dried artificially, by exposing them repeatedly to the heat of a stove. They are in general best preserved in their natural coverings, although some, as the colocynth, are peeled, and others, as the tamarind, preserved fresh. Many seeds and fruits are apt to spoil, or become rancid; and as they are then no longer fit for medical use, no very large quantity of them should be collected at a time.

336. The proper drying of vegetable substances is of the greatest importance. It is often directed to be done in the shade, and slowly, that the volatile and active particles may not be dissipated by too great heat: but this is an error; for they always lose infinitely more by slow than by quick drying. When, on account of the colour, they cannot be exposed to the sun, and the warmth of the atmosphere is insufficient, they should be dried by an artificial warmth, less than 100° Fahrenheit, and exposed to a free current of air. When perfectly dry and friable, they have little smell; but after being kept some time, they attract moisture from the air, and regain their proper odour.

337. The boxes and drawers in which vegetable substances are kept, should not impart to them any smell or taste; and more certainly to avoid this, they should be lined with paper. Such as are volatile, of a delicate texture, or subject to suffer from insects, must be kept in well covered glasses. Fruits and oily seeds, which are apt to become rancid, must be kept in a cool and dry, but by no means in a warm or moist place.

338. Oily seeds, odorous plants, and those containing volatile principles, should be collected fresh every year; others, whose properties are more permanent, and not subject to decay, will keep for several years.

339. Vegetables collected in a moist and rainy season, are in general watery, and apt to spoil. In a dry season, on the contrary, they contain more oily and resinous particles, are more active, and keep much better.

MECHANICAL OPERATIONS OF PHARMACY.

a. The determination of the weight and bulk of bodies.
b. The division of bodies into more minute particles.

c. The separation of their integrant parts by mechanical means.

d. Their mixture, when not attended by any chemical action.

WEIGHTS AND MEASURES.

340. The quantities of substances employed in pharmaceutical operations are most accurately determined by the process called weighing. For this purpose, there should be sets of beams and scales of different sizes; and it would be advisable to have a double set, one for ordinary use, and another for occasions when greater accuracy is necessary. A good beam should remain in equilibrium both by itself and when the scales are suspended, one to either end indifferently; and it should turn sensibly with a very small proportion of the weight with which it is loaded. Balances should be defended as much as possible from acid and other corrosive vapours, and should not be overloaded, or left suspended longer than is necessary, as their delicacy is thereby very much impaired.

341. The want of uniformity of weights and measures is attended with many inconveniencies. In this country, druggists and grocers sell by avoirdupois weight; and the apothecaries are directed to sell by troy weight, although, in fact, they seldom use the troy weight for more than two drachms. But as the troy pound is less than the avoirdupois, and the ounce and drachm greater, numerous and culpable errors must arise. Comparative tables of the value of the troy, avoirdupois, and new French decimal weights, are given in the appendix.

342. The errors arising from the promiscuous use of weights and measures, have induced the Edinburgh college to reject the use of measures entirely, and to direct that the quantity of every fluid, as well as solid, shall be determined by troy weight: but as the London and Dublin colleges sanction the use of measures, and as, from the much greater facility of their employment, apothecaries will always use them, tables of measures are also inserted in the appendix.

343. For measuring fluids, the graduated glass measures are always to be preferred: they should be of different sizes, according to the quantities they are intended to measure. Elastic fluids are also measured in glass tubes, graduated by inches and their decimals.

SPECIFIC GRAVITY.

344. Specific gravity is the weight of a determinate bulk of any body. As a standard of comparison, distilled water has

been assumed as unity. The specific gravity of solids is ascertained, by comparing the weight of the body in the air with its weight when suspended in water. The quotient obtained by dividing its weight in air, by the difference between its weight in air and its weight in water, is its specific gravity. The specific gravity of fluids may be ascertained by comparing the weight of a solid body, such as a piece of crystal, when immersed in distilled water, with its weight when immersed in the fluid we wish to examine; by dividing its loss of weight in the fluid by its loss of weight in the water, the quotient is the specific gravity of the fluid: or a small phial, containing a known weight of distilled water, may be filled with the fluid to be examined, and weighed, and by dividing the weight of the fluid by the weight of the water, the specific gravity is ascertained.

Although these are the only general principles by which specific gravities are ascertained, yet as the result is always influenced by the state of the thermometer and barometer at the time of the experiments, and as the manipulation is a work of great nicety, various ingenious instruments have been contrived to render the process and calculation easy. Of all these, the gravimeter of Morveau seems to deserve the preference.

It would be of material consequence to science and the arts, if specific gravities were always indicated by the numerical term expressing their relation to the specific gravity of distilled water. This, however, is unfortunately not the case. The excise in this country collect the duties paid by spiritous liquors, by estimating the proportion which they contain of a standard spirit, about 0.933 in specific gravity, which they call hydrometer proof; and they express the relation which spirits of a different strength have to the standard spirit, by saying that they are above or under hydrometer proof. Thus, one to six, or one in seven below hydrometer proof, means, that it is equal in strength to a mixture of six parts of proof spirit with one of water.

The only other mode of expressing specific gravities, which it is necessary to notice, is that of Baumé's areometer, as it is often used in the writings of the French chemists, and is little understood in this country. For substances heavier than water he assumes the specific gravity of distilled water as zero, and graduates the stem of his instrument downwards, each degree being supposed by him to express the number of parts of muriate of soda contained in a given solution; which, however, is not at all the case. For substances lighter than water the tube is graduated upward, and this zero is afforded by a solution of 1 of salt in 9 water. In the appendix, tables are given of the specific gravities, corresponding with all the degrees of both of these areometers, from Nicolson's Journal.

MECHANICAL DIVISION.

345. By mechanical division, substances are reduced to a form better adapted for medical purposes; and by the increase of their surface, their action is promoted, both as medical and chemical agents.

346. It is performed by cutting, bruising, grinding, grating, rasping, filing, pulverization, trituration, and granulation, by means of machinery or of proper instruments.

347. *Pulverization* is the first of these operations that is commonly employed in the apothecary's shop. It is performed by means of pestles and mortars. The bottom of the mortars should be concave; and their sides should neither be so inclined as not to allow the substances operated on to fall to the bottom between each stroke of the pestle, nor so perpendicular as to collect it too much together, and to retard the operation. The materials of which the pestles and mortars are formed, should resist both the mechanical and chemical action of the substances for which they are used. Wood, iron, marble, siliceous stones, porcelain, and glass, are all employed; but copper, and metals containing copper, are to be avoided.

348. They should be provided with covers, to prevent the finest and lightest parts from escaping, and to defend the operator from the effects of disagreeable or noxious substances. But these ends are more completely attained, by tying a piece of pliable leather round the pestle, and round the mouth of the mortar. It must be closely applied, and at the same time so large, as to permit the free motion of the pestle.

349. In some instances, it will be even necessary for the operator to cover his mouth and nostrils with a wet cloth, and to stand with his back to a current of air, that the very acrid particles which arise may be carried from him.

350. The addition of a little water or spirit of wine, or of a few almonds, to very light and dry substances, will prevent their flying off. But almonds are apt to induce rancidity, and powders are always injured, by the drying which is necessary when they have been moistened Water must never be added to substances which absorb it, or are rendered cohesive by it.

351. Too great a quantity of any substance must never be put into the mortar at a time, as it very much retards the operation.

352. All vegetable substances must be previously dried. Resins and gummy resins, which become soft in summer, must be powdered in very cold weather, and must be beaten gently, or they will be converted into a paste, instead of being powdered. Wood, roots, barks, horn, bone, ivory, &c. should be previously

cut, split, chipped, or rasped. Fibrous woods and roots should be finely shaved after their bark is removed, for otherwise, their powders will be full of hair-like filaments, which can scarcely be separated. Some substances will even require to be moistened with mucilage of tragacanth, or of starch, and then dried before they can be powdered. Camphor may be conveniently powdered by the addition of a little spirit of wine, or almond oil. The emulsive seeds cannot be reduced to powder, unless some dry powder be added to them. To aromatic oily substances, sugar is the best addition.

353. All impurities and inert parts having been previously separated, the operation must be continued and repeated upon vegetable substances, till no residuum is left. The powders obtained at different times must then be intimately mixed together, so as to bring the whole to a state of perfect uniformity.

354. Very hard stony substances must be repeatedly heated to a red heat, and then suddenly quenched in cold water, until they become sufficiently friable. Some metals may be powdered hot in a heated iron mortar, or may be rendered brittle by alloying them with a little mercury.

355. *Trituration* is intended for the still more minute division of bodies. It is performed in flat mortars of glass, agate, or other hard materials, by giving a rotatory motion to the pestle; or on a levigating stone, which is generally of porphyry, by means of a muller of the same substance. On large quantities it is performed by rollers of hard stone, turning horizontally upon each other, or by one vertical roller turning on a flat stone.

356. *Levigation* differs from trituration only in the addition of water or spirit of wine to the powder operated upon, so as to form the whole mass into a kind of paste, which is rubbed until it be of sufficient smoothness or fineness. Earths, and some metallic substances, are levigated.

357. The substances subjected to this operation are generally previously powdered or ground.

358. *Granulation* is employed for the mechanical division of some metals. It is performed, either by stirring the melted metal with an iron rod until it cools, or by pouring it into water, and stirring it continually as before, or by pouring it into a covered box, previously well rubbed with chalk, and shaking it until the metal cools, when the rolling motion will be converted into a rattling one. The adhering chalk is then to be washed away.

MECHANICAL SEPARATION.

359. *Sifting*. From dry substances, which are reduced to the due degree of minuteness, the coarser particles are to be sepa-

rated by sieves of iron wire, hair-cloth, or gauze, or by being dusted through bags of linen. For very light and valuable powders, or acrid substances, compound sieves, having a close lid and receiver, must be used. The particles which are not of sufficient fineness to pass through the interstices of the sieve, may be again powdered.

360. *Elutriation* is confined to mineral substances, on which water has no action. It is performed for separating them from foreign particles and impurities, of a different specific gravity, in which case they are said to be washed; or for separating the impalpable powders, obtained by trituration and levigation from the coarser particles. This process depends upon the property that very fine or light powders have of remaining for some time suspended in water; and is performed by diffusing the powder or paste formed by levigation through plenty of water, letting it stand a sufficient time, until the coarser particles settle at the bottom, and then pouring off the liquid in which the finer or lighter particles are suspended. Fresh water may be poured on the residuum, and the operation repeated; or the coarser particles, which fall to the bottom, may be previously levigated a second time.

361. *Decantation.* The fine powder which is washed over with the water, is separated from it, by allowing it to subside completely, and by either decanting off the water very carefully, or by drawing it off by a syringe or syphon. These processes are very frequently made use of for separating fluids from solids, which are specifically heavier, especially when the quantity is very large, or the solid so subtile as to pass through the pores of most substances employed for filtration, or the liquid so acrid as to corrode them.

362. *Filtration.* For the same purpose of separating fluids from solids, straining and filtration are often used. These differ only in degree, and are employed when the powder either does not subside at all, or too slowly and imperfectly for decantation.

363. The instruments for this purpose are of various materials, and must in no instance be acted upon by the substances for which they are employed. Fats, resins, wax, and oils, are strained through hemp or flax, spread evenly over a piece of wire-cloth or net stretched in a frame. For saccharine and mucilaginous liquors, fine flannel may be used; for some saline solutions, linen. Where these are not fine enough, unsized paper is employed, but it is extremely apt to burst by hot watery liquors. Very acrid liquors, such as acids, are filtered by means of a glass funnel, filled with powdered quartz, a few of the larger pieces being put in the neck, smaller pieces over these, and the fine powder placed over all. The porosity of

this last filter retains much of the liquor; but it may be obtained by gently pouring on it as much distilled water; the liquor will then pass through, and the water will be retained in its place.

364. Water may be filtrated in large quantities through basins of porous stone, or artificial basins of nearly equal parts of fine clay and coarse sand. In large quantities it may be easily purified *per ascensum,* the purified liquor and impurities thus taking opposite directions. The simplest apparatus of this kind is a barrel, divided perpendicularly, by a board perforated with a row of holes along the lower edge. Into each side, as much well washed sand is put as will cover these holes an inch or two, over which must be placed a layer of pebbles to keep it steady. The apparatus is now fit for use. Water poured into the one half will sink through the sand in that side, pass through the holes in the division to the other, and rise through the sand in the other half, and from which it may be drawn by a stop-cock.

365. The size of the filters depends on the quantity of matter to be strained. When large, the flannel or linen is formed into a conical bag, and suspended from a hoop or frame; the paper is either spread on the inside of these bags, or folded into a conical form, and suspended by a funnel. It is of advantage to introduce glass rods or quills between the paper and funnel, to prevent them from adhering too closely.

366. What passes first is seldom fine enough, and must be poured back again, until by the swelling of the fibres of the filter, or filling up of its pores, the fluid acquires the requisite degree of limpidity. The filter is sometimes covered with charcoal powder, which is a useful addition to muddy and deep-coloured liquors. The filtration of some viscid substances is much assisted by heat.

367. *Expression* is a species of filtration, assisted by mechanical force. It is principally employed to obtain the juices of fresh vegetables, and the unctuous vegetable oils. It is performed by means of a screw press, with plates of wood, iron, or tin. The subject of the operation is previously beaten, ground, or bruised. It is then inclosed in a bag, which must not be too much filled, and introduced between the plates of the press. The bags should be of hair-cloth, or canvas inclosed in hair-cloth. Hempen and wollen bags are apt to give vegetable juices a disagreeable taste. The pressure should be gentle at first, and increased gradually.

368. Vegetables intended for this operation should be perfectly fresh, and freed from all impurities. In general they should be expressed as soon as they are bruised, for it disposes them to ferment; but subacid fruits give a larger quantity of juice, and

of finer quality, when they are allowed to stand some days in a wooden or earthen vessel after they are bruised. To some vegetables which are not juicy enough, the addition of a little water is necessary. Lemons and oranges must be peeled, as their skins contain a great deal of essential oil, which would mix with the juice. The oil itself may be obtained separately, by expression with the fingers on a plate of glass.

369. For unctuous seeds iron plates are used; and it is customary not only to heat the plates, but to warm the bruised seeds in a kettle over the fire, after they have been sprinkled with water, as by these means the product is increased, and the oil obtained is more limpid. But as the oils obtained in this way are more disposed to rancidity, this process should either be laid aside altogether, or changed to exposing the bruised seeds, inclosed in a bag, to the steam of hot water.

370. *Despumation* is generally practised on thick and clammy liquors, which contain much slimy and other impurities, not easily separable by filtration. The scum is made to arise, either by simply heating the liquor, or by *clarifying* it, which last is done by mixing with the liquor, when cold, white of egg well beaten with a little water, which on being heated coagulates, and rises to the surface, carrying with it all the impurities. The liquor may now be filtered with ease, or may be skimmed with a perforated ladle. Spirituous liquors are clarified, without the assistance of heat, by means of isinglass dissolved in water, or any albuminous fluid, as milk, which coagulates with the action of alcohol. Some expressed juices, as those of all the antiscorbutic plants, are instantly clarified by the addition of any vegetable acid, as the juice of bitter oranges.

371. Fluids can only be separated from each other, when they have no tendency to combine, and when they differ in specific gravity. The separation may be effected by skimming off the lighter fluid with a silver or glass spoon; or by drawing it off by a syringe or syphon; or by means of a glass separatory, which is an instrument having a projecting tube, terminating in a very slender point, through which the heavier fluid alone is permitted to run; or by means of the capillary attraction of a spongy woollen thread; for no fluid will enter a substance whose pores are filled by another, for which it has no attraction; and, lastly, upon the same principle, by means of a filter of unsized paper, previously soaked in one of the fluids, which in this way readily passes through it, while the other remains behind.

372. *Mechanical mixture* is performed by agitation, trituration, or kneading; but these will be best considered in treating of the forms in which medicines are exhibited.

APPARATUS.

373. Before entering on the chemical operations, it will be necessary to make a few remarks on the instruments employed in performing them. They may be divided into

a. The vessels in which the effects are performed;
b. The means of producing heat, or fuel; and
c. The means of applying and regulating the heat; or lamps and furnaces.

VESSELS.

374. The vessels, according to the purposes for which they are intended, vary

a. In form; and
b. In materials.

375. The different forms will be best described when treating of the particular operations.

376. No substance possesses properties which render it proper to be employed as a material in every instance. We are therefore obliged to select those substances which possess the properties more especially required in the particular operations for which they are intended.

377. The properties most generally required, are

a. The power of resisting chemical agents;
b. Transparency;
c. Compactness;
d. Strength;
e. Fixity and infusibility;
f. And the power of bearing sudden variations of temperature without breaking.

378. The metals in general possess the four last properties in considerable perfection, but they are all opaque. Iron and copper are apt to be corroded by chemical agents, and the use of the latter is often attended with dangerous consequences. These objections are in some measure, but not entirely, removed by tinning them. Tin and lead are too fusible. Platinum, gold, and silver, resist most of the chemical agents, but their expence is an insurmountable objection to their general use.

379. Good earthen ware resists the greatest intensity of heat, but is deficient in all the other properties. The basis of all kinds of earthen ware is clay, which possesses the valuable quality of being very plastic when wrought with water, and of becoming

extremely hard when burnt with an intense heat. But it contracts so much by heat, that it is extremely apt to crack and split, on being exposed to sudden changes of temperature; it is therefore necessary to add some substance which may counteract this property. Siliceous sand, clay reduced to powder, and then burnt with a very intense heat, and plumbago, are occasionally used. These additions, however, are attended with other inconveniencies; plumbago, especially, is liable to combustion, and sand diminishes the compactness, so that it becomes necessary to glaze most kinds of earthen ware; but when glazed, they are acted upon by chemical agents. The vessels manufactured by Messrs. Wedgworth are the best of this description, except those of porcelain, which are too expensive.

380. Glass possesses the three first qualities in an eminent degree, and may be heated red-hot without melting. Its greatest inconvenience is its disposition to crack, or break in pieces, when suddenly heated or cooled. As this is occasioned by its unequal expansion or contraction, glass vessels should be made very thin, and of a round form. They should also be well annealed, that is, cooled very slowly, when blown, by placing them immediately in a heated oven, while they are yet in a soft state. When ill annealed, or cooled suddenly, glass is apt to fly in pieces on the slightest change of temperature, or touch of a sharp point. We sometimes take advantage of this imperfection; for by means of a red-hot wire, glass vessels may be cut into any shape. When there is not a crack already in the glass, the point of the wire is applied near the edge, a crack is formed, which is afterwards easily led in any direction.

381. Reaumur's porcelain, on the contrary, is glass, which by surrounding it with hot sand, is made to cool so slowly, that it assumes a crystalline texture, which destroys its transparency, but imparts to it every other quality wished for in chemical vessels. The coarser kinds of glass are commonly used in making it; but as there is no manufacture of this valuable substance, its employment is still very limited.

LUTES.

382. Lutes also form a necessary part of chemical apparatus. They are compositions of various substances, intended

a. To close the joinings of vessels;
b. To coat glass vessels;
c. To line furnaces.

383. Lutes of the first description are commonly employed to confine elastic vapours. They should therefore possess the following properties:

a. Viscidity, plasticity, and compactness.
b. The power of resisting acrid vapours.
c. The power of resisting certain degrees of heat.

384. The viscidity of lutes depends on the presence either of

a. Unctuous or resinous substances;
b. Mucilaginous substances; or
c. Clay or lime.

385. Lutes of the first kind (383, *a*) possess the two first class of properties in an eminent degree; but they are in general so fusible, that they cannot be employed when they are exposed even to very low degrees of heat, and they will not adhere to any substance that is at all moist. Examples.

a. Eight parts of yellow wax, melted with one of oil of turpentine, with or without the addition of resinous substances, according to the degree of pliability and consistence required. Lavoisier's lute.
b. Four parts of wax, melted with two of varnish and one of olive oil Saussure's lute.
c. Three parts of powdered clay, worked up into a paste, with one of drying oil, or, what is better, amber varnish. The drying oil is prepared by boiling 22.5 parts of litharge in 16 of linseed oil until it be dissolved. Fat lute.
d. Chalk and oil, or glazier's putty, is well fitted for luting tubes permanently into glass vessels, for it becomes so hard that it cannot be easily removed.
e. Equal parts of litharge, quicklime, and powdered clay, worked into a paste with oil varnish, is sometimes applied over the cracks in glass vessels, so as to fit them for some purposes.
f. Melted pitch and brick dust.

386. Mucilaginous substances (384, *b*) such as flour, starch, gum, and glue, mixed with water, are sufficiently adhesive, are dried by moderate degrees of heat, and are easily removed after the operation, by moistening them with water: but a high temperature destroys them, and they do not resist corrosive vapours. The addition of an insoluble powder is often necessary, to give them a sufficient degree of consistency. Examples.

a. Slips of bladder, softened in water, and applied with the inside next the vessels. They are apt, however, from their great contraction in drying, to break weak vessels.

b. One part of gum arabic with six or eight of chalk, formed into a paste with water.

c. Flour worked into a paste with powdered clay or chalk.

d. Almond or linseed meal formed into a paste with mucilage or water.

e. Quicklime in fine powder, hastily mixed with white of egg, and instantly applied, sets very quickly, but becomes so hard that it can scarcely be removed.

f. Slaked lime in fine powder, with glue, does not set so quickly as the former.

g. The cracks of glass vessels may be cemented by daubing them and a suitable piece of linen over with white of egg, strewing both over with finely powdered quicklime, and instantly applying the linen closely and evenly.

387. Earthy lutes (383, *c*) resist very high temperatures, but they become so hard that they can scarcely be removed, and often harden so quickly after they are mixed up, that they must be applied immediately. Examples.

a. Quicklime well incorporated with a sixth part of muriate of soda.

b. Burnt gypsum, made up with water.

c. One ounce of borax dissolved in a pound of boiling water, mixed with a sufficient quantity of powdered clay. Mr. Watt's fire-lute.

d. One part of clay with four of sand, formed into a paste with water. This is also used for coating glass vessels, in order to render them stronger, and capable of resisting intense heat. It is then made into a very thin mass, and applied in successive layers, taking care that each coat be perfectly dry before another be laid on.

388. The lutes for lining furnaces will be described when treating of furnaces.

389. The junctures of vessels which are to be luted to each other, should previously be accurately and firmly fitted, by introducing between them, when necessary, short pieces of wood or cork, or, if the disproportion be very great, by means of a cork fitted to the one vessel, having a circular hole bored through it, through which the neck of the other vessel or tube may pass.

390. After being thus fitted, the lute is either applied very thin, by spreading it on slips of linen or paper, and securing it with thread; or if it is a paste lute, it is formed into small cylinders, which are successively applied to the junctures, taking care that each piece be made to adhere firmly and perfectly close

in every part before another is put on. Lastly, the whole is secured by slips of linen or bladder.

391. In many cases, to permit the escape of elastic vapours, a small hole is made through the lute with a pin, or the lute is perforated by a small quill, fitted with a stopper.

HEAT AND FUEL.

392. As caloric is an agent of the most extensive utility in the chemical operations of pharmacy, it is necessary that we should be acquainted with the means of employing it in the most economical and efficient manner.

393. The rays of the sun are used in the drying of many vegetable substances; and the only attentions necessary, are to expose as large a surface as possible, and to turn them frequently, that every part may be dried alike. They are also sometimes used for promoting spontaneous evaporation.

394. Combustion is a much more powerful and certain source of heat. Alcohol, oil, tallow, wood, turf, coal, charcoal, and coke, are all occasionally employed.

395. Alcohol, oil, and melted tallow, can only be burnt on porous wicks, which draw up a portion of the fluid to be volatilized and inflamed. Fluid inflammables are therefore burnt in lamps of various constructions. But although commonly used to produce light, they afford a uniform, but not high temperature. This may however be increased, by increasing the number and size of the wicks. Alcohol produces a steady heat, no soot, and, if strong, leaves no residuum. Oil gives a higher temperature, but on a common wick produces much smoke and soot. These are diminished, and the light and heat increased, by making the surface of the flame bear a large proportion to the centre; which is best done by a cylindrical wick, so contrived that the air has free access both to the outside and inside of the cylinder, as in Argand's lamp, invented by Mr. Boulton of Birmingham. In this way, oil may be made to produce a considerable temperature, of great uniformity, and without the inconvenience of smoke.

396. Wicks have the inconvenience of being charred by the high temperature to which they are subjected, and becoming so clogged as to prevent the fluid from rising in them. They must then be trimmed; but this is seldomer necessary with alcohol and fine oils than with the coarser oils. Lamps are also improved by adding a chimney to them. It must admit the free access of air to the flame, and then it increases the current, confines the heat, and steadies the flame. The intensity of the temperature of flame may be greatly increased by forcing a small current of hot air through it, as by the blowpipe.

397. Wood, turf, coal, charcoal, and coke, solid combustibles, are burnt in grates and furnaces. Wood has the advantage of kindling readily, but affords a very unsteady temperature, is inconvenient from its flame, smoke, and soot, and requires much attention. The heavy and dense woods give the greatest heat, burn longest, and leave a dense charcoal.

398. Dry turf gives a steady heat, and does not require so much attention as wood; but it consumes fast, its smoke is copious and penetrating, and the empyreumatic smell which it imparts to every thing it comes in contact with, adheres to them with great obstinacy. The heavy turf of marshes is preferable to the light superficial turf.

399. Coal is the fuel most commonly used in this country. Its heat is considerable, and sufficiently permanent, but it produces much flame and smoke.

400. Charcoal, especially of the dense woods, is a very convenient and excellent fuel. It burns without flame or smoke, and gives a strong, uniform, and permanent heat, which may be easily regulated, especially when it is not in too large pieces, and is a little damp. But it is costly, and burns quickly.

401. Coke, or charred coal, possesses similar properties with charcoal; it is less easily kindled, but is capable of producing a higher temperature, and burns more slowly.

402. When an open grate is used for chemical purposes, it should be provided with cranes to support the vessels, that they may not be overturned by the burning away of the fuel.

FURNACES.

403. In all furnaces, the principal objects are, to produce a sufficient degree of heat, with little consumption of fuel, and to be able to regulate the degree of heat.

404. An unnecessary waste of fuel is prevented by forming the sides of the furnace of very imperfect conductors of caloric, and by constructing it so that the subject operated on may be exposed to the full action of the fire.

405. The degree of heat is regulated by the quantity of air which comes in contact with the burning fuel. The quantity of air is in the compound ratio of the size of the aperture through which it enters, and its velocity. The velocity is increased by mechanical means, as by bellows, or by increasing the height and width of the chimney.

406. The size and form of furnaces, and the materials of which they are constructed, are various, according to the purposes for which they are intended.

407. The essential parts of a furnace are,

a. A body for the fuel to burn in;
b. A grate for it to burn upon;
c. An ash-pit to admit air and receive the ashes;
d. A chimney for carrying off the smoke and vapours.

408. The ash-pit should be perfectly close, except the door, which should be furnished with a register-plate, to regulate the quantity of air admitted.

409. The bars of the grate should be triangular, and placed with an angle pointed downwards, and not above half an inch distant. The grate should be fixed on the outside of the body.

410. The body may be cylindrical or elliptical, with apertures for introducing the fuel and the subjects of the operation, and for conveying away the smoke and vapours.

411. When the combustion is supported by the current of air naturally excited by the burning of the fuel, it is called a wind-furnace; when it is accelerated by increasing the velocity of the current by bellows, it forms a blast-furnace; and when the body of the furnace is covered with a dome, which terminates in the chimney, it constitutes a reverberatory furnace.

412. Furnaces are either fixed, and built of fire-brick, or portable, and fabricated of plate-iron. When of iron, they must be lined with some badly conducting and refractory substance, both to prevent the dissipation of heat, and to defend the iron against the action of the fire. A mixture of scales of iron and powdered tiles, worked up with blood, hair, and clay, is much recommended; and Professor Hagen says, that it is less apt to split and crack when exposed at once to a violent heat, than when dried gradually, according to the common directions. Dr. Black employed two different coatings. Next to the iron, he applied a composition of three parts, by weight, of charcoal, and one of fine clay, first mixed in the state of fine powder, and then worked up with as much water as permitted the mass to be formed into balls, which were applied to the sides of the furnace, and beat very firm and compact with the face of a broad hammer, to the thickness of about one inch and a half, in general, but so as to give an elliptical form to the cavity. Over this, another lute, composed of six or seven parts of sand, and one of clay, was applied, in the same manner, to the thickness of about half an inch. These lutes must be allowed to become perfectly dry before the furnace is heated, which should at first be done gradually. They may also be lined with fire-bricks of a proper form, accurately fitted and well cemented together before the top-plate is screwed on.

413. The general fault of furnaces is, that they admit so much air, as to prevent us from regulating the temperature,

which either becomes too violent and unmanageable, or when more cold air is admitted than what is necessary for supporting the combustion, the heat is carried off, and the temperature cannot be raised sufficiently. The superior merit of Dr. Black's furnace consists in the facility with which the admission of air is regulated; and every attempt hitherto made to improve it, by increasing the number of its apertures, have in reality injured it.

414. Heat may be applied to vessels employed in chemical operations,

a. Directly, as in the open fire and reverberatory furnace;
b. Or through the medium of sand; the sand bath;
c. Of water; the water bath;
d. Of steam; the vapour bath;
e. Of air, as in the muffle.

CHEMICAL OPERATIONS.

415. In all chemical operations, combination takes place, and there are very few of them in which decomposition does not also occur. For the sake of method, we shall consider them as principally intended to produce,

a. Change in the form of aggregation;
b. Combination;
c. Decomposition.

416. The form of aggregation may be altered by,

a. Fusion;
b. Vaporization;
c. Condensation;
d. Congelation;
e. Coagulation.

417. *Liquefaction* is commonly employed to express the melting of substances, as tallow, wax, resin, &c. which pass through intermediate states of softness before they become fluid. Fusion is the melting of substances which pass immediately from the solid to the fluid state, as the salts and metals, except iron and platinum.

418. *Fusion* is the conversion of a solid into a liquid by the sole agency of caloric. Substances differ very much in the degrees of their fusibility; some, as water and mercury, existing as fluids in the ordinary temperatures of the atmosphere; while others, as the pure earths, cannot be melted by any heat we can produce.

419. When a substance acquires by fusion a degree of trans-

parency, a dense uniform texture, and great brittleness, and exhibits a conchoidal fracture, with a specular surface, and the edges of the fragments very sharp, it is said to be *vitrified*.

420. In general, simple substances are less fusible than compounds; thus the simple earths cannot be melted singly, but when mixed, are easily fused. The additions which are sometimes made to refractory substances to promote their fusion, are termed *fluxes*.

421. These fluxes are generally saline bodies.

a. The alkalies, potass, and soda, promote powerfully the fusion of siliceous stones; but they are only used for accurate experiments. The *white flux* is a mixture of a little potass with carbonate of potass; and is prepared by deflagrating together equal parts of nitrate of potass and super-tartrate of potass. When an oxide is at the same time to be reduced, the *black* flux is to be preferred, which is produced by the deflagration of two parts of super-tartrate of potass, and one of nitrate of potass. It differs from the former only in containing a little charcoal. Soap promotes fusion by being converted by the fire into carbonate of soda and charcoal.

b. Aluminous stones have their fusion greatly promoted by the addition of sub-borate of soda.

c. Muriate of soda, the mixed phosphate of soda and ammonia, and other salts, are also occasionally employed.

422. An open fire is sufficient to melt some substances; others require the heat of a furnace.

423. The vessels in which fusion is performed, must resist the heat necessary for the operation. In some instances, an iron or copper ladle or pot may be used; but most commonly crucibles are employed. Crucibles are of various sizes. The large crucibles are generally conical, with a small spout for the convenience of pouring out: the small ones are truncated triangular pyramids, and are commonly sold in nests.

424. The Hessian crucibles are composed of clay and sand, and when good, will support an intense heat for many hours, without softening or melting; but they are disposed to crack when suddenly heated or cooled. This inconvenience may be on many occasions avoided, by using a double crucible, and filling up the interstice with sand, or by covering the crucible with a lute of clay and sand; by which means the heat is transmitted more gradually and equally. Those which give a clear sound when struck, and are of an uniform thickness, and have a reddish brown colour, without black spots, are reckoned the best.

425. Wedgwood's crucibles are made of clay mixed with

baked clay finely pounded, and are in every respect superior to the Hessian, but they are very expensive.

426. The black lead crucibles, formed of clay and plumbago, are very durable, resist sudden changes of temperature, and may be repeatedly used; but they are destroyed when saline substances are melted in them, and suffer combustion when exposed red-hot to a current of air.

427. When placed in a furnace, crucibles should never be set upon the bars of the grate, but always upon a support. Dr. Kennedy found the hottest part of a furnace to be about an inch above the grate. They may be covered, to prevent the fuel or ashes from falling into them, with a lid of the same materials, or with another crucible inverted over them.

428. When the fusion is completed, the substance may be either permitted to cool in the crucible, or poured into a heated mould anointed with tallow, never with oil, or, what is still better, covered with a thin coating of chalk, which is applied by laying it over with a mixture of chalk diffused in water, and then evaporating the water completely by heat. To prevent the crucible from being broken by cooling too rapidly, it should be either replaced in the furnace, to cool gradually with it, or covered with some vessel to prevent its being exposed immediately to the air.

429. Fusion is performed with the intentions,

a. Of weakening the attraction of aggregation,
   1. To facilitate mechanical division;
   2. To promote chemical action.
b. Of separating from each other, substances of different degrees of fusibility.

430. *Vaporization* is the conversion of a solid or fluid into vapour by the agency of caloric. Although vaporability be merely a relative term, substances are said to be permanently elastic, volatile, or fixed. The permanently elastic fluids or gases are those which cannot be condensed into a fluid or solid form by any abstraction of caloric we are capable of producing. Fixed substances, on the contrary, are those which cannot be converted into vapour by great increase of temperature. The pressure of the atmosphere has a very considerable effect in varying the degree at which substances are converted into vapour. Some solids, unless subjected to very great pressure, are at once converted into vapour, although most of them pass through the intermediate state of fluidity.

431. Vaporization is employed,

a. To separate substances differing in volatility.
b. To promote chemical action, by disaggregating them.

432. When employed with either of these views, either

a. No regard is paid to the substances volatilized,
  1. From solids, as in ustulation and charring;
  2. From fluids, as in evaporation;

b. Or the substances vaporized are condensed in proper vessels,
  1. In a liquid form, as in distillation,
  2. In a solid form, as in sublimation;

c. Or the substances vaporized are permanently elastic, and are collected in their gaseous form, in a pneumatic apparatus.

433. *Ustulation* is almost entirely a metallurgic operation, and is employed to expel the sulphur and arsenic contained in some metallic ores. It is performed on small quantities in tests placed within a muffle. Tests are shallow vessels made of bone ashes, or baked clay. Muffles are vessels of baked clay, of a semi-cylindrical form, the flat side forming the floor, and the arched portion the roof and sides. The end and sides are perforated with holes for the free transmission of the heated air, and the open extremity is placed at the door of the furnace, for the inspection and manipulation of the process. The reverberatory furnace is commonly employed for roasting, and the heat is at first very gentle, and slowly raised to redness. It is accelerated by exposing as large a surface of the substance to be roasted as possible, and by stirring it frequently, so as to prevent any agglutination, and to bring every part in succession to the surface.

434. *Charring* may be performed on any of the compound oxides, by subjecting them to a degree of heat sufficient to expel all their hydrogen, nitrogen, and superabundant oxygen, while the carbon, being a fixed principle, remains behind in the state of charcoal. The temperature necessary for the operation may be produced either by the combustion of other substances, or by the partial combustion of the substance to be charred. In the former case, the operation may be performed in any vessel which excludes the air, while it permits the escape of the vapours formed. In the latter, the access of air must be regulated in such a manner, that it may be suppressed whenever the combustion has reached the requisite degree; for if continued to be admitted, the charcoal itself would be dissipated in the form of carbonic acid gas, and nothing would remain but the alkaline and earthy matter, which these substances always contain. When combustion is carried this length, the process is termed *incineration*. The vapours which arise in the operation

of charring, are sometimes condensed, as in the manufacture of tar.

435. *Evaporation* is the conversion of a fluid into vapour, by its combination with caloric. In this process, the atmosphere is not a necessary agent, but rather a hindrance, by its pressure. This forms a criterion between evaporation and spontaneous evaporation, which is merely the solution of a fluid in air.

436. It is performed in open, shallow, or hemispherical vessels of silver, tinned copper or iron, earthen-ware or glass. The necessary caloric may be furnished by means of an open fire, a lamp, or a furnace, supplied either directly, or by the intervention of sand, water, or vapour. The degree of heat must be regulated by the nature of the substance operated on. In general, it should not be greater than what is absolutely necessary.

437. Evaporation may be,

a. Partial:
  1. From saline fluids, concentration;
  2. From viscid fluids, inspissation.

b. Total exsiccation.

438. *Concentration* is employed,

a. To lessen the quantity of diluting fluids; deflegmation:
b. As a preliminary step to crystallization.

439. *Inspissation* is almost confined to animal and vegetable substances; and as these are apt to be partially decomposed by heat, or to become empyreumatic, the process should always be performed, especially towards the end, in a water or vapour bath.

440. *Exsiccation* is here taken in a very limited sense; for the term is also with propriety used to express the drying of vegetables by a gentle heat, the efflorescence of salts, and the abstraction of moisture from mixtures of insoluble powders with water, by means of chalk-stones, or powdered chalk pressed into a smooth mass. At present, we limit its meaning to the total expulsion of moisture from any body by means of caloric.

441. The exsiccation of compound oxides should always be performed in the water bath.

442. Salts are deprived of their water of crystallization by exposing them to the action of heat in a glass vessel or iron ladle. Sometimes they first dissolve in their water of crystallization (or undergo what is called the *watery fusion*), and are afterwards converted into a dry mass by its total expulsion; as in the calcination of borax or burning of alum.

443. When exsiccation is attended with a crackling noise, and splitting of the salt, as in muriate of soda, it is termed *decrepita-*

tion, and is performed by throwing into a heated iron vessel, small quantities of the salt at a time, covering it up, and waiting until the decrepitation be over, before a fresh quantity is thrown in.

444. Exsiccation is performed on saline bodies, to render them more acrid or pulverulent, or to prepare them for chemical operations. Animal and vegetable substances are exsiccated to give them a solid form, and to prevent their fermentation.

445. *Condensation* is the reverse of expansion, and is produced either,

- *a*. By mechanical pressure forcing out the caloric in a sensible form, as water is squeezed out of a sponge ; or,
- *b*. By the chemical abstraction of caloric, which is followed by an approximation of the particles of the substance.

446. The latter species of condensation only is the object of our investigation at present. In this way we may be supposed to condense,

- *a*. Substances existing naturally as gases or vapours ;
- *b*. Substances, naturally solid or fluid, converted into vapours by adventitious circumstances.

447. The former instance is almost suppositious ; for, except the oxygenized muriatic acid gas, we are not able, by any diminution of temperature, to reduce the permanently elastic fluids to a fluid or solid state.

448. The latter instance is always preceded by vaporization, and comprehends those operations in which the substances vaporised are condensed in proper vessels. When the product is a fluid, it is termed distillation ; when solid, sublimation.

449. *Distillation* is said to be performed,

- *a*. *Viâ humidâ*, when fluids are the subject of the operation;
- *b*. *Viâ siccâ*, when solids are subjected to the operation, and the fluid product arises from decomposition, and a new arrangement of the constituent principles.

450. The objects of distillation are,

- *a*. To separate more volatile fluids from less volatile fluids or solids ;
- *b*. To promote the union of different substances ;
- *c*. To generate new products by the action of fire.

451. In all distillations, the heat applied should not be greater than what is necessary for the formation of the vapour, and even

to this degree it should be gradually raised. The vessels also in which the distillation is performed, should never be filled above one-half, and sometimes not above one-fourth, lest the substance contained in them should boil over.

452. As distillation is a combination of evaporation and condensation, the apparatus consists of two principal parts;

a. The vessels in which the vapours are formed.
b. The vessels in which they are condensed.

453. The vessels employed for both purposes are variously shaped, according to the manner in which the operation is conducted. The first difference depends on the direction of the vapour after its formation. It either

a. Descends; distillation *per descensum:*
b. Ascends; distillation *per ascensum:*
c. Or passes off by the side; distillation *per latus*.

454. In the distillation *per descensum*, a perforated plate, generally of tinned iron, is fixed within any convenient vessel, so as to leave a space beneath it. The subject of the operation is laid on this plate, and is covered by another, accurately fitting the vessel, and sufficiently strong to support the fuel which is burnt upon it. Thus the heat is applied from above, and the vapour is forced to descend into the inferior cavity, where it is condensed. In this way the oil of cloves is prepared, and on the same principles tar is manufactured, and mercury and zinc are separated from their ores.

455. In the distillation *per ascensum* the vapour is allowed to arise to some height, and then is conveyed away to be condensed. The vessel most commonly employed for this purpose is the common copper still, which consists of a body for containing the materials, and a head into which the vapour ascends. From the middle of the head a tube rises a short way, and is then reflected downwards, through which the steam passes to be condensed. Another kind of head, rising to a great height before it is reflected, is sometimes used for separating fluids, which differ little in volatility, as it was supposed that the less volatile vapours would be condensed, and fall back into the still, while only the more volatile vapours would arise to the top, so as to pass to the refrigeratory. The same object may be more conveniently attained by managing the fire with caution and address. The greater the surface exposed, and the less the height the vapours have to ascend, the more rapidly does the distillation proceed; and so well are these principles understood by the Scotch distillers, that they do not take more than three minutes to discharge a still containing 50 gallons of fluid.

456. The condensing apparatus used with the common still is very simple. The tube in which the head terminates, is inserted into the upper end of a pipe, which is kept cool by passing through a vessel filled with water, called the Refrigeratory. This pipe is commonly made of a serpentine form; but as this renders it difficult to be cleaned, Dr. Black recommends a sigmoid pipe. The refrigeratory may be furnished with a stop-cock, that when the water it contains becomes too hot, and does not condense all the vapour produced, it may be changed for cold water. From the lower end of the pipe, the product of the distillation drops into the vessel destined to receive it; and we may observe, that when any vapour issues along with it, we should either diminish the power of the fire, or change the water in the refrigeratory.

457. *Circulation* was a process formerly in use. It consisted in arranging the apparatus, so that the vapours were no sooner condensed into a fluid form, than this fluid returned back into the distilling vessels, to be again vaporised; and was effected by distilling in a glass vessel, with so long a neck that the vapours were condensed before they escaped at the upper extremity, or by inverting one matras within another.

458. When corrosive substances are distilled in this way, the cucurbit and alembic are used; but these substances are more conveniently distilled *per latus*.

459. The distillation *per latus* is performed in a retort, or pear-shaped vessel, having the neck bent to one side. The body of a good retort is well rounded, uniform in its appearance, and of an equal thickness, and the neck is sufficiently bent to allow the vapours, when condensed, to run freely away, but not so much as to render the application of the receiver inconvenient, or to bring it too near the furnace. The passage from the body into the neck must be perfectly free and sufficiently wide, otherwise the vapours produced in the retort only circulate in its body, without passing over into the receiver. For introducing liquors into the retort without soiling its neck, which would injure the product, a bent funnel is necessary. It must be sufficiently long to introduce the liquor directly into the body of the retort; and in withdrawing it, we must carefully keep it applied to the upper part of the retort, that the drop hanging from it may not touch the inside of the neck. In some cases, where a mixture of different substances is to be distilled, it is convenient and necessary to have the whole apparatus properly adjusted before the mixture is made, and we must therefore employ a tubulated retort, or a retort furnished with an aperture, accurately closed with a ground stopper.

460. The tubulature should be placed on the upper convex part of the retort before it bends to form the neck, so that a fluid

poured through it may fall directly into the body without soiling the neck.

461. Retorts are made of various materials. Flint-glass is commonly used when the heat is not so great as to melt it. For distillations which require excessive degrees of heat, retorts of earthen-ware, or coated (376, *d)* glass retorts, are employed. Quicksilver is distilled in iron retorts.

462. The simplest condensing apparatus used with the retort, is the common glass receiver; which is a vessel of a conical or globular form, having a neck sufficiently wide to admit the neck of a retort. To prevent the loss and dissipation of the vapours to be condensed, the retort and receiver may be accurately ground to each other, or secured by some proper lute. Means must also be used to prevent the receiver from being heated by the caloric evolved during the condensation of the vapours. It may either be immersed in cold water, or covered with snow or pounded ice; or a constant evaporation may be supported from its surface, by covering it with a cloth, kept moist by means of the descent of water, from a vessel placed above it, through minute syphons of spongy worsted threads. But as, during the process of distillation, permanently elastic fluids are often produced, which would endanger the breaking of the vessels, these are permitted to escape, either through a tubulature, or hole in the side of the receiver, or rather through a hole made in the luting (380.) Receivers having a spout issuing from their side, are used when we wish to keep separate the products obtained at different periods of any distillation. For condensing very volatile vapours, a series of receivers, communicating with each other, termed Adopters, were formerly used; but these are now entirely superseded by Woulfe's apparatus.

463. This apparatus consists of a tubulated retort, adapted to a tubulated receiver. With the tubulature of the receiver, a three-necked bottle is connected by means of a bent tube, the further extremity of which is immersed, one or more inches, in some fluid contained in the bottle. A series of two or three similar bottles are connected with this first bottle in the same way. In the middle tubulature of each bottle, a glass tube is fixed, having its lower extremity immersed about a quarter of an inch in the fluid. The height of the tube above the surface of the fluid, must be greater than the sum of the columns of fluid standing over the further extremities of the connecting tubes, in all the bottles or vessels more remote from the retort. Tubes so adjusted are termed Tubes of Safety, for they prevent that reflux of fluid from the more remote into the nearer bottles, and into the receiver itself, which would otherwise inevitably happen, on any condensation of vapour taking place in the retort,

receiver, or nearer bottles. Different contrivances for the same purpose have been described by Messrs. Welter and Burkitt; and a very ingenious mode of connecting the vessels without lute, has been invented by Citizen Girard, but they would not be easily understood without plates. The further tubulature of the last bottle is commonly connected with a pneumatic apparatus, by means of a bent tube. When the whol is properly adjusted, air blown into the retort should pass through the receiver, rise in bubbles through the fluids contained in each of the bottles, and at last escape by the bent tube In the receiver, those products of distillation are collected, which are condensable by cold alone. The first bottle is commonly filled with water, and the others with alkaline solutions, or other active fluids; and as the permanently elastic fluids produced, are successively subjected to the action of all of these, only those gases will escape by the bent tube which are not absorbable by any of them.

PNEUMATIC APPARATUS.

464. The great importance of the elastic fluids in modern chemistry, has rendered an acquaintance with the means of collecting and preserving them indispensable.

465. When a gas is produced by any means, it may be received either,

a. Into vessels absolutely empty; or
b. Into vessels filled with some fluid, on which it exerts no action.

466. The first mode (465, *a*) of collecting gases, may be practised by means of a bladder, moistened sufficiently to make it perfectly pliable, and then compressed so as to empty it entirely. In this state it may be easily filled with any gas. An oiled silk bag will answer the same purpose, and is more convenient in some respects, as it may be made of any size or form.

467. Glass or metallic vessels, such as balloons, may also be emptied for the purpose of receiving gases, by fitting them with a stop-cock, and exhausting the air from them by means of an air-pump.

468. But the second mode (465, *b*) of collecting gases is the most convenient and common.

469. The vessels may be filled either,

a. With a fluid lighter; or
b. Heavier than the gas to be received into it.

470. The former method is seldom employed; but if we conduct a stream of any gas heavier than atmospheric air, such as

carbonic acid gas, muriatic acid gas, &c. to the bottom of any vessel, it will gradually displace the air, and fill the vessel.

471. On the contrary, a gas lighter than the atmospheric air, such as hydrogen, may be collected in an inverted vessel by conducting a stream of it to the top.

472. But gases are most commonly collected by conducting the stream of gas into an inverted glass jar, or any other vessel filled with water or mercury. The gas ascends to the upper part of the vessel, and displaces the fluid. In this way gas may be kept a very long time, provided a small quantity of the fluid be left in the vessels, which prevents both the escape of the gas, and the admission of atmospheric air.

473. The vessels may be of various shapes; but the most commonly employed are cylindrical. They may be either open only at one extremity, or furnished at the other with a stop-cock.

474. The manner of filling these vessels with fluid, is to immerse them completely in it, with the open extremity directed a little upwards, so that the whole air may escape from them, and then inverting them with their mouths downwards.

475. For filling them with convenience, a trough or cistern is commonly used. This either should be hollowed out of a solid block of wood or marble; or, if it be constructed of wood, it should be well painted, or lined with lead or tinned copper. Its size may vary very much; but it should contain a sufficient depth of fluid to cover the largest transverse diameter of the vessels to be filled in it. At one end or side, there should be a shelf for holding the vessels after they are filled. This shelf should be placed about an inch and a half below the surface of the fluid, and should be perforated with several holes, forming the apices of corresponding conical excavations on the lower side, through which, as through inverted funnels, gaseous fluids may be more easily introduced into the vessels placed over them. In general, the vessels used with a mercurial apparatus should be stronger and smaller than those for a water-cistern.

476. We should also have a variety of glass and elastic tubes for conveying the gases from the vessels in which they are formed to the funnels under the shelf.

477. *Rectification* is the repeated distillation of any fluid. When distillation renders the fluid stronger, or abstracts water from it, it is termed *Dephlegmation*. When a fluid is distilled off from any substance, it is called *Abstraction*; and if the product be redistilled from the same substance, or a fresh quantity of the substance, it is denominated *Cohobation*.

478. *Sublimation* differs from distillation only in the form of the product. When it is compact, it is termed a Sublimate; when loose and spongy, it formerly had the improper appellation of Flowers. Sublimation is sometimes performed in a crucible,

and the vapours are condensed in a paper cone, or in another crucible inverted over it; sometimes in the lower part of a glass flask, cucurbit, or phial, and the condensation is effected in the upper part or capital, and sometimes in a retort with a very short and wide neck, to which a conical receiver is fitted. The heat is most commonly applied through the medium of a sand-bath; and the degree of heat, and the depth to which the vessel is inserted in it, are regulated by the nature of the sublimation.

479. *Congelation* is the reduction of a fluid into a solid form, in consequence of the abstraction of caloric. The means employed for abstracting caloric are the evaporation of volatile fluids, the solution of solids, and the contact of cold bodies.

480. *Coagulation* is the conversion of a fluid into a solid of greater or less consistence, merely in consequence of a new arrangement of its particles, as during the process there is no separation of caloric or any other substance. The means of producing coagulation are, increase of temperature, and the addition of certain substances, as acids and runnets.

COMBINATION.

481. Chemical combination is the intimate union of the particles of at least two heterogeneous bodies. It is the effect resulting from the exertion of the attraction of affinity, and is therefore subjected to all the laws of affinity.

482. To produce the chemical union of any bodies, it is necessary,

1. That they possess affinity for each other;
2. That their particles come into actual contact;
3. That the strength of the affinity be greater than any counteracting causes which may be present.

483. The principal counteracting causes are,

1. The attraction of aggregation;
2. Affinities for other substances.

484. The means to be employed for overcoming the action of other affinities will be treated of under Decomposition.

485. The attraction of aggregation is overcome by means of

1. Mechanical division;
2. The action of caloric.

486. Combination is facilitated by increasing the points of actual contact.

1. By mechanical agitation;
2. By condensation; compression.

487. The processes employed for producing combination, may be considered,

1. With regard to the nature of the substances combined; and,
2. To the nature of the compound produced.

Gases,

1. Combine with gases;
2. And dissolve fluids or solids;
3. Or are absorbed by them.

Fluids,

1. Are dissolved in gases;
2. Or absorb them;
3. Combine with fluids;
4. And dissolve solids;
5. Or are rendered solid by them.

Solids,

1. Are dissolved in fluids and in gases; or,
2. Absorb gases;
3. And solidify fluids.

488. The combination of gases with each other, in some instances, takes place when simply mixed together: thus nitrous and oxygen gases combine as soon as they come into contact; in other instances, it is necessary to elevate their temperature to a degree sufficient for their inflammation, either by means of the electric spark, or the contact of an ignited body, as in the combination of oxygen gas with hydrogen or nitrogen gas.

489. When gases combine with each other, there is always a considerable diminution of bulk, and not unfrequently they are condensed into a liquid or solid form. Hydrogen and oxygen gases form water: muriatic acid and ammonia gases form solid muriate of ammonia. But when the combination is effected by ignition, a violent expansion, which endangers the bursting of the vessels, previously takes place, in consequence of the increase of temperature.

490. *Solution* is the diminution of aggregation in any solid or fluid substance, in consequence of its entering into chemical combination. The substance, whether solid or fluid, whose aggregation is lessened, is termed the *Solvend;* and the substance, by

whose agency the solution is effected, is often called the *Menstruum* or *Solvent.*

491. Solution is said to be performed *via humida,* when the natural form of the solvent is fluid; but when the agency of heat is necessary to give the solvent its fluid form, the solution is said to be performed *via sicca.*

492. The dissolving power of each menstruum is limited, and is determinate with regard to each solvend. The solubility of bodies is also limited and determinate with regard to each menstruum

493. When any menstruum has dissolved the greatest possible quantity of any solvend, it is said to be saturated with it. But, in some cases, although saturated with one substance, it is still capable of dissolving others. Thus a saturated solution of muriate of soda will dissolve a certain quantity of nitrate of potass, and after that a portion of muriate of ammonia.

494. The dissolving power of solvents, and consequently the solubility of solvends, are generally increased by increase of temperature; and conversely, this power is diminished by diminution of temperature; so that, from a saturated solution, a separation of a portion of the solvend generally takes place on any reduction of temperature. This property becomes extremely useful in many chemical operations, especially in crystallization.

495. Particular terms have been applied to particular cases of solution.

496. The solution of a fluid in the atmosphere is termed *spontaneous evaporation.* It is promoted by exposing a large surface, by frequently renewing the air in contact with the surface, and by increase of temperature.

497. Some solids have so strong an affinity for water, that they attract it from the atmosphere in sufficient quantity to dissolve them. These are said to *deliquesce.* Others, on the contrary, retain their water of crystallization with so weak a force, that the atmosphere attracts it from them, so that they crumble into powder These are said to *effloresce.* Both operations are promoted by exposing large surfaces, and by a current of air; but the latter is facilitated by a warm dry air, and the former by a cold humid atmosphere.

498. Solution is also employed to separate substances (for example, saline bodies), which are soluble in the menstruum, from others which are not. When our object is to obtain the soluble substance in a state of purity, the operation is termed *lixiviation.* In this as small a quantity of the menstruum as is possible is used. When, however, solution is employed to free an insoluble substance from soluble impurities, it is termed *edulcoration,* which is best performed by using a very large quantity of the menstruum.

499. Organic products being generally composed of heterogeneous substances, are only partially soluble in the different menstrua. To the solution of any of these substances, while the others remain undissolved, the term *extraction* is applied; and when, by evaporation, the substance extracted is reduced to a solid form, it is termed an Extract, which is hard or soft, watery or spirituous, according to the degree of consistency it acquires, and the nature of the menstruum employed.

500. *Infusion* is employed to extract the virtues of aromatic and volatile substances, which would be dissipated by decoction, and destroyed by maceration, and to separate substances of easy solution from others which are less soluble. The process consists in pouring upon the substance to be infused, placed in a proper vessel, the menstruum, either hot or cold, according to the direction, covering it up, agitating it frequently, and after a due time, straining or decanting off the liquor, which is them termed the Infusion.

501. *Maceration* differs from infusion, it being continued for a longer time, and can only be employed for substances which do not easily ferment or spoil.

502. *Digestion*, on the other hand, differs from maceration only in the activity of the menstruum being promoted by a gentle degree of heat. It is commonly performed in a glass matrass, which should only be filled one-third, and covered with a piece of wet bladder, pierced with one or more small holes, so that the evaporation of the menstruum may be prevented as much as possible, without risk of bursting the vessel. The vessel may be heated, either by means of the sun's rays, of a common fire, or of the sand-bath; and when the last is employed, the vessel should not be sunk deeper in the sand than the portion that is filled. Sometimes, when the menstruum employed is valuable, a distilling apparatus is used to prevent any waste of it. At other times, a blind capital is luted on the matrass, or a smaller matrass is inverted within a larger one; and as the vapour which arises is condensed in it, and runs back into the larger, the process in this form has got the name of *Circulation*.

503. *Decoction* is performed by subjecting the substances operated on to a degree of heat, which is sufficient to convert the menstruum into vapour, and can only be employed with advantage for extracting principles which are not volatile, and from substances whose texture is so dense and compact as to resist the less active methods of solution. When the menstruum is valuable, that portion of it which is converted into vapour is generally saved by condensing it in a distilling apparatus.

504. Solutions in alcohol are termed Tinctures, and in vinegar or wine, Medicated vinegars or wines. The solution of

metals in mercury is termed Amalgamation. The combinations of other metals with each other form Alloys.

505. *Absorption* is the condensation of a gas into a fluid or solid form, in consequence of its combination with a fluid or solid. It is facilitated by increase of surface and agitation; and the power of absorption in fluids is much increased by compression and diminution of temperature, although in every instance it be limited and determinate. Dr. Nooth invented an ingenious apparatus for combining gases with fluids; and Messrs. Schweppe, Henry, Paul, and Cuthbertson, have very advantageously employed compression.

506. Fluids often become solid by entering into combination with solids; and this change is always accompanied by considerable increase of temperature, as in the slaking of lime.

DECOMPOSITION.

507. *Decomposition* is the separation of bodies which were chemically combined.

508. It can only be affected by the agency of substances possessing a stronger affinity for one or more of the constituents of the compound, than these possess for each other.

509. Decomposition has acquired various appellations, according to the phenomena which accompany it.

510. *Dissolution* differs from solution in being accompanied by the decomposition, or a change in the nature of the substance dissolved. Thus, we correctly say, a solution of lime in muriatic acid, and a dissolution of chalk in muriatic acid.

511. Sometimes a gas is separated during the action of bodies on each other. When this escapes with considerable violence and agitation of the fluid, it is termed *effervescence*. The gas is very frequently allowed to escape into the atmosphere, but at other times is either collected in a pneumatic apparatus, or made to enter into some new combination. The vessels in which an effervescing mixture is made, should be high and sufficiently large, to prevent any loss of the materials from their running over; and in some cases the mixture must be made slowly and gradually.

512. *Precipitation* is the reverse of solution. It comprehends all those processes in which a solid is obtained by the decomposition of a solution. The substance separated is termed a Precipitate, if it sink to the bottom of the fluid; or a Cream, if it swim above it. Precipitation, like solution, is performed either *via humida*, or *via sicca*.

513. The objects of precipitation are,

1. The separation of substances from solutions in which they are contained;

2. The purification of solutions from precipitable impurities;
3. The formation of new combinations.

514. Precipitation is effected,

1. By lessening the quantity of the solvent by evaporation;
2. By diminishing its solvent power, as by reduction of temperature, or dilution;
3. Or by the addition of some chemical agent, which from its more powerful affinities,
   - *a.* Either combines with the solvent, and precipitates the solvend,
   - *b.* Or forms itself an insoluble compound with some constituent of the solution.

515. The two first means of precipitation have been already noticed. Indeed they are rarely considered as instances of precipitation, as the effect is gradual, and the precipitated matter most commonly assumes determinate figures.

516. In performing it in the last manner, we may observe the following rules:

1. The solution and precipitant must possess the requisite degree of purity.
2. The solution should be perfectly saturated, to avoid unnecessary consumption of the solvent or precipitant.
3. The one is to be added slowly and gradually to the other.
4. After each addition, they are to be thoroughly mixed by agitation.
5. We must allow the mixture to settle, after we think that enough of the precipitant has been added, and try a little of the clear solution, by adding to it some of the precipitant: if any precipitation takes place, we have not added enough of the precipitant. This precaution is necessary, not only to avoid loss, but in many instances, the precipitant, if added in excess, re-dissolves or combines with the precipitate.

517. After the precipitation is completed, the precipitate is to be separated from the supernatant fluid by some of the means already noticed.

518. When the precipitate is the chief object of our process, and when it is not soluble in water, it is often advisable to dilute, to a considerable degree, both the solution and precipitant, before performing the operation. When it is only difficultly soluble, we must content ourselves with washing the precipitate,

after it is separated by filtration. In some cases, the separation of the precipitate is much assisted by a gentle heat.

519. *Crystallization* is a species of precipitation, in which the particles of the solvend, on separating from the solution, assume certain determinate forms.

520. The conditions necessary for crystallization are,

1. That the integrant particles have a tendency to arrange themselves in a determinate manner when acted on by the attraction of aggregation;
2. That they be disaggregated, at least so far as to possess sufficient mobility to assume their peculiar arrangement;
3. That the causes disaggregating them be slowly and gradually removed.

521. Notwithstanding the immense variety in the forms of crystals, M. Hauy has rendered it probable, that there are only three forms of the integrant particles:

1. The parallelopiped.
2. The triangular prism.
3. The tetrahedron.

522. But as these particles may unite in different ways, either by their faces or edges, they will compose crystals of various forms.

523. The primitive forms have been reduced to six:

1. The parallelopiped.
2. The regular tetrahedron.
3. The octahedron with triangular faces.
4. The six-sided prism.
5. The dodecahedron terminated by rhombs.
6. The dodecahedron with isosceles triangular faces.

524. Almost all substances, on crystallizing, retain a portion of water combined with them, which is essential to their existence as crystals, and is therefore denominated water of crystallization. Its quantity varies very much in different crystallized substances.

525. The means by which the particles of bodies are disaggregated, so as to admit of crystallization, are solution, fusion, vaporization, or mechanical division and suspension in a fluid medium.

526. The means by which the disaggregating causes are removed, are, evaporation, reduction of temperature, and rest.

527. When bodies are merely suspended in a state of extreme mechanical division, nothing but rest is necessary for their crystallization.

528. When they are disaggregated by fusion or vaporization, the regularity of their crystals depends on the slowness with which their temperature is reduced; for if cooled too quickly, their particles have not time to arrange themselves, and are converted at once into a confused or unvaried solid mass. Thus glass, which, when cooled quickly, is so perfectly uniform in its appearance, when cooled slowly, has a crystalline texture. But in order to obtain crystals by means of fusion, it is often necessary, after the substance has begun to crystallize, to remove the part which remains fluid; for otherwise it would fill up the interstices among the crystals first formed, and give the whole the appearance of one solid mass. Thus, after a crust has formed on the top of melted sulphur, by pouring off the still fluid part, we obtain regular crystals.

529. The means by which bodies, which have been disaggregated by solution, are made to crystallize most regularly, vary according to the habitudes of the bodies with their solvents and caloric.

530. Some saline substances are much more soluble in hot than in cold water; therefore, a boiling saturated solution of any of these will deposite, on cooling, the excess of salt, which it is unable to dissolve when cold. These salts commonly contain much water of crystallization.

531. Other salts are scarcely, if at all, more soluble in hot than in cold water; and therefore their solutions must be evaporated, either by heat, or spontaneously. These salts commonly contain little water of crystallization.

532. The beauty and size of the crystals depend upon the purity of the solution, its quantity, and the mode of conducting the evaporation and cooling.

533. When the salt is not more soluble in hot than in cold water, by means of gentle evaporation, a succession of pellicles are formed on the top of the solution, which either are removed, or permitted to sink to the bottom by their own weight; and the evaporation is continued until the crystallization be completed.

534. But when the salt is capable of crystallizing on cooling, the evaporation is only continued until a drop of the solution, placed upon some cold body, shews a disposition to crystallize, or at farthest only until the first appearance of a pellicle. The solution is then covered up, and set aside to cool; and the more slowly it cools, the more regular are the crystals. The mother-water, or solution which remains after the crystals are formed, may be repeatedly treated in the same way as long as it is capable of furnishing any more salt.

535. When very large and beautiful crystals are wanted, they may be obtained by laying well-formed crystals in a saturated solution of the same salt, and turning them every day. In this

way their size may be considerably increased, though not without limitation; for after a certain time, they grow smaller instead of larger.

536. Crystallization is employed,

1. To obtain crystallizable substances in a state of purity;
2. To separate them from each other, by taking advantage of their different solubility at different temperatures.

OXYGENIZEMENT.

537. The combination of oxygen is the object of many chemical and pharmaceutical processes.

538. With regard to the manner of combination, the oxygenizement may take place, either,

- *a.* Without the production of heat and light, to express which there is no other than the generic term *oxygenizement;* or,
- *b.* With the production of heat and light; *combustion.*
    1. In substances which remain fixed at the temperature necessary for their combustion, there is no other more specific term;
    2. In substances which exist as gases, or are previously reduced to the state of vapour by the temperature necessary, it is termed *inflammation;* and if it proceed with very great violence and rapidity, *deflagration.*

539. Combustion and inflammation have been already described.

540. *Deflagration*, from its violence, must always be performed with caution. The common mode of conducting this process is, to introduce the substances to be deflagrated together into any convenient vessel, commonly an iron pot, or crucible, heated to redness. But to obviate any inconvenience, and to insure the success of the process, they are previously made perfectly dry, reduced to powder, and thoroughly mixed together. The compound is then deflagrated gradually, generally by spoonfuls; but we must take care always to examine the spoon, lest a spark should adhere to it, which might set fire to the whole mass. During the process, the portion introduced should be frequently stirred.

541. The oxygen necessary for the processes may be derived from the decomposition,

- *a.* Of oxygen gas, or atmospheric air;
- *b.* Of oxides, particularly water;

- *c.* Of acids and their combinations, especially the oxygenized muriatic and nitric acids.

542. The different modes of oxygenizement are intended either

- *a.* To produce heat and light;
- *b.* To obtain an oxygenized product;
    1. An oxide, when the process may be termed *Oxidizement;*
    2. An acid, *Acidification.*
- *c.* To remove an oxygenizable substance.

543. Hydrogen, carbon, and nitrogen, are never, unless for experiment, oxygenized as simple substances.

544. Sulphur is converted into sulphuric acid by burning it in leaden chambers, or by deflagrating it with nitrate of potass; and phosphorous is acidified by inflammation in the atmosphere.

545. Of all the simple oxygenizable substances, the metals are most frequently combined with oxygen; and as, in consequence of this combination, they lose their metallic appearance, they were formerly said to be calcined or corroded.

546. Metals differ very much in the facility with which they are oxygenized by the contact of oxygen gas. For some, as iron and manganese, the ordinary temperature of the atmosphere is sufficient; others, as gold and platinum, scarcely undergo any change in the most violent heat. The operation is performed by heating them to the requisite temperature, and exposing them to the action of the air; and on the fusible metals it is promoted by stirring them when melted.

547. Metals also differ in the mode of their action upon water. They are either capable of decomposing water,

- *a.* At ordinary temperatures, as iron, zinc, manganese, &c.
- *b.* At elevated temperatures, as antimony and tin; or
- *c.* When acted upon at the same time by an acid or an alkali, as copper, lead, bismuth; or, lastly,
- *d.* They are incapable of decomposing it, as gold, silver, mercury, platinum.

548. The oxygenizement of metals by water is promoted by the action of air. Iron, for example, is more quickly rusted by being merely moistened with water, than when totally immersed in water.

549. But the acids are the most powerful agents in oxygenizing metals. They act in two ways, either,

1. By enabling them to decompose water.
2. By being decomposed themselves.

550. Sulphuric acid is decomposed by very few metals, unless assisted by a considerable increase of temperature; but it powerfully promotes the decomposition of water.

551. Nitric acid is decomposed by many of the metals with very great violence, proceeding, in some instances, even to inflammation. It also oxygenizes them to the highest degree of which they are susceptible. It seldom produces the decomposition of water.

552. Muriatic acid is never decomposed, and only acts on those metals capable of decomposing water.

553. Oxygenized muriatic acid resembles the nitric, both in the violence of its action, and in the extent to which it carries the oxygenizement of the metals.

554. The metals are susceptible of different degrees of oxygenizement, some of them even of acidification, and, in general, they are more oxygenized according to the rapidity of the process. When proceeding too slowly, it may be accelerated by heat; when too violent, it must be checked by diminution of temperature, as by plunging the vessel in which the operation is performing into cold water.

555. When the degree of oxygenizement is not very great, the oxide formed generally enters into combination with the acid employed, and forms a metallic salt; but when carried to its highest degree, the oxide is often insoluble.

DISOXYGENIZEMENT OF METALLIC OXIDES AND ACIDS.

556. This process was formerly termed *reduction*, from its restoring the metals to their metallic splendour, and is performed by causing some body to act upon them, which has a greater affinity for oxygen than they have. The different metals themselves vary very much in the degree of this affinity, so that they are reduced with very different degrees of facility. Gold, silver, platinum, and mercury, are reduced by merely exposing them to a sufficient degree of heat in close vessels. The oxygen at this temperature has a greater affinity for caloric than for the metals, and is therefore driven off in the form of very pure oxygen gas.

557. The other metallic oxides which resist the simple action of heat, may be reduced by melting them in contact with charcoal, or substances which may be charred, such as oil, fat, rosin, pitch, &c. Besides the charcoal, different saline fluxes are also added, to facilitate the fusion of the oxide.

558. The oxide to be reduced is mixed with a sufficient quantity of any of these substances, and placed in the bottom of a crucible, which is afterwards filled up with charcoal powder, to prevent entirely the access of the air, and exposed for a length

of time to a sufficiently high temperature, when a button of the metal will commonly be found in the bottom of the crucible. Upon the volatile metals, such as arsenic and zinc, this operation must be performed in a distilling or subliming apparatus. Some metallic oxides, such as those of platinum, columbium, &c. cannot be reduced, from our being unable to produce a degree of heat sufficient to melt them.

559. Metals may be also obtained from the metallic salts, by inserting in a solution of these a plate of another metal, possessing a stronger affinity for oxygen than for the acid. Thus copper is precipitated by iron, and arsenic by zinc. We must only take care that the two metals have no remarkable affinity for each other, as in that case an alloy is commonly produced. For example, when mercury is placed in a solution of silver, a crystallized amalgam of silver is obtained, formerly called the Arbor Dianæ.

560. The compound oxides may be further oxygenized, by treating them with nitric acid. In this way various oxides and acids are formed, according to the nature of the oxide operated on, the quantity of the acid, and the mode of conducting the process.

561. They also undergo changes by gradually combining with the oxygen of the atmosphere. In some cases, this combination is attended with remarkable phenomena, which have been classed under the term *fermentation.*

562. There are several species of fermentation, which have been named from the products they afford.

1. The saccharine, which produces sugar.
2. The vinous, which produces wine, beer, and similar fluids.
3. The panary, which produces bread.
4. The acetous, which produces vinegar.
5. The putrefactive, which produces ammonia.

563. The same substances are sometimes capable of undergoing the first, second, fourth, and fifth; or third, fourth, and fifth, successively, but never in a retrograde order.

564. The conditions necessary for all of them are,

1. The presence of a sufficient quantity of fermentable matter;
2. The presence of a certain proportion of water;
3. The contact of atmospheric air; and,
4. A certain temperature.

565. *The saccharine fermentation.*—The seeds of barley, when moistened with a certain quantity of water, and exposed to the

contact of the atmospheric air, at a temperature of not less than 50°, swell, and shew marks of incipient vegetation, by pushing forth the radicle. If at this period the fermentation be checked, by exposing them to a considerable degree of heat, and drying them thoroughly, the insipid amylaceous matter, of which the seeds principally consisted, will be found to be changed in part into a sweet saccharine substance. The oxygen of the air, in contact with the seeds, is at the same time converted into carbonic acid gas, by combining with part of the carbon of the seeds; and there is a considerable increase of temperature in the fermenting mass, even to such a degree as sometimes to set it on fire. Similar phenomena occur in the maturation of fruits; in the cookery of some roots and fruits, and during the heating of hay, when put up too wet.

566. *The vinous fermentation.*—The conditions necessary for the vinous fermentation, are the presence of proper proportions of sugar, acid, extract, and water, and a temperature of about 70°. When these circumstances exist, an intestine motion commences in the fluid; it becomes thick and muddy, its temperature increases, and carbonic acid gas is evolved. After a time the fermentation ceases, the feces rise to the top, or subside to the bottom, the liquor becomes clear, it has lost its saccharine taste, and assumed a new one, and its specific gravity is diminished. If the fermentation has been complete, the sugar is entirely decomposed, and the fermented liquor consists of a large proportion of water, of alcohol, of malic acid, of extract, of essential oil, and colouring matter. The substances most commonly subjected to this fermentation are must, which is the expressed juice of the grape, and which produces the best wines; the juice of the currant and gooseberry, which, with the addition of sugar, form our home-made wines; the juices of the apple and pear, which give cyder and perry; and an infusion of malt, which, when fermented with yeast, forms beer. The briskness and sparkling of some of these liquors depend on their being put into close vessels before the fermentation is completed, by which means a portion of carbonic acid gas is retained.

567. *The acetous fermentation.*—All vinous liquors are susceptible of the acetous fermentation, provided they be exposed to the action of the atmosphere, in a temperature not less than 70°. An intestine motion and hissing noise sensibly take place in the fluid, it becomes turbid, with filaments floating in it, and its temperature increases; it exhales a pungent acid smell, without any disengagement of carbonic acid gas. Gradually these phenomena cease; the temperature decreases, the motion subsides, and the liquor becomes clear, having deposited a sediment and red glairy matter, which adheres to the sides of the vessel.

During this process, the alcohol and malic acid disappear entirely, oxygen is absorbed, and acetous acid formed.

568. *The panary and colouring fermentation*—is less understood than those already described. A paste of wheat-flour and water, exposed at a temperature of 65°, swells, emits a small quantity of gas, and acquires new properties. The gluten disappears, and the paste acquires a sour disagreeable taste. If a just proportion of this fermented paste or leaven, or what is still better, if some barm be formed into a paste with wheat-flower and water, the same fermentation is excited, without the disagreeable taste being produced; the gas evolved is prevented from escaping by the viscidity of the paste, which therefore swells, and if baked, forms light spongy bread.

569. *The putrefactive fermentation.*—Although vegetable substances, when they are destroyed by spontaneous decomposition, are said to putrefy, we shall consider this fermentation as belonging exclusively to animal substances, or those which contain nitrogen as an elementary principle. The essential conditions of putrefaction are humidity, and a temperature between 45° and 110°. The presence of air, the diminution of pressure, and the addition of ferments, are not essential, but accelerate its progress. The smell is at first insipid and disagreeable, but afterwards insupportably fetid, although the fetor, for a time, is somewhat diminished by the mixture of an ammoniacal odour. Liquids become turbid and flocculent. Soft substances melt down into a gelatinous mass, in which there is a kind of gentle motion and swelling up, from the slow and scanty formation of elastic fluids. Solids, beside the general softening, exude a serosity of various colours, and by degrees the whole mass dissolves, the swelling ceases, the matter settles, and its colour deepens; at last its odour becomes somewhat aromatic, its elements are finally dissipated, and there remains only a kind of fat, viscid, and still fetid mould. The products of putrefaction are carburetted, sulphuretted, and phosphuretted hydrogen gases, water, ammonia, azote, and carbonic acid. These are all dissipated in the form of gas or vapour. When in contact with air, oxygen is absorbed. Acetic acid, a fatty matter, a soap composed of this fat and ammonia, and often the nitric acid, fixed by a salifiable base, are also produced; and the ultimate remains, besides salts, composed of acid and earths, contain for a long time a portion of fat charry matter.

APPENDIX.

WEIGHTS AND MEASURES.

ENGLISH.

APOTHECARIES WEIGHT.

Pound.	Ounces.	Drams.	Scruples.	Grains.	Grammes.
=	12 =	96 =	288 =	5760 =	372.96
	1 =	8 =	24 =	480 =	31.08
		1 =	3 =	60 =	3.885
			1 =	20 =	1.295
				1 =	0.06475

AVOIRDUPOIS WEIGHT.

Pound.	Ounces.	Drams.	Grains.	Grammes.
1 =	16 =	256 =	7000 =	453.25
	1 =	16 =	437.5 =	28.32
		1 =	27.975 =	1,81

WINE MEASURE.

Gal.	Pints	Ounces.	Drams.	Cub. Inch.	Litres
1 =	8 =	128 =	1024 =	231 =	3.78515
	1 =	16 =	128 =	28.875 =	0.47398
		1 =	8 =	1.8047 =	0.02957
			1 =	0.2256 =	0.00396

N. B.—The ale-gallon contains 282 cubical inches.
A cubic inch of water weighs 253 grains.

Reduction of the Ounce Measure used by Dr. Priestley to Cubical Inches.

Ounce Measures.	*French Cubical Inches.*	*English Cubical Inches.*
1	1.567	1.898
2	3.134	3.796
3	4.701	5.694
4	6.268	7.592
5	7.835	9.490
6	9.402	11.388
7	10.969	13.286
8	12.536	15.184
9	14.103	17.082
10	15.670	18.980
20	31.340	37.960
30	47.010	56.940
40	62.680	75.920
50	78.350	94.900
60	94.020	113.880
70	109.690	132.860
80	125.360	151.840
90	141.030	170.820
100	156.700	189.800
1000	1567.000	1898.000

Correspondence between English and Foreign Weights and Measures.

NEW FRENCH.

'To employ, as the fundamental unity of all measures, a type 'taken from nature itself, a type as unchangeable as the globe on which 'we dwell,—to propose a metrical system, of which all the parts are 'intimately connected together, and of which the multiples and subdi'visions follow a natural progression, which is simple, easy to com'prehend:—this is most assuredly a beautiful, great, and sublime 'idea, worthy of the enlightened age in which we live.'

Such were the ideas which influenced the French National Institute, when they chose as the base of the whole metrical system, the fourth part of the terrestrial meridian between the equator and the north pole. They adopted the ten millionth part of this arc for the unity of measure, which they denominated *metre*, and applied it both to superficial and solid measures, taking for the unity of the former the square of the decuple, and for that of the latter the cube of the tenth part of the metre. They chose for the unity of weight, the quantity of distilled water which the same cube contains when reduced to a constant state presented by nature itself; and lastly, they decided that the multiples and sub-multiples of each kind of measure, whether of weight, capacity, surface, or length, should be always taken in the decimal progression, as being the most simple, the most natural, and the most easy for calculation, according to the system of numeration which all Europe has employed for centuries.

By a careful measurement of the arc between Dunkirk and Mountjoy, they found the length of the metre to be equal to 443.296 lines of the toise of Peru. The cubic decimetre of distilled water, taken as its maximum of density and weight *in vacuo*, that is the unity of weight, was found to be 18827.15 grains of the pile of Charlemagne. By actual comparison, the metre was found to be equal to 39.371 English inches at 62°, the temperature universally employed in the comparison of English standards: and upon these data the following tables have been constructed.

MEASURES OF LENGTH:

The Metre being at 32°, and the Foot at 62°.

		English Inches.		*Mil.*	*Fur.*	*Yards.*	*Feet.*	*Inch.*
Millimetre	=	.03937						
Centimetre	=	.39371						
Decimetre	=	3.93710						
Metre	=	39.37100						
Decametre	=	393.71000	=	0	0	10	2	9.7
Hecatometre	=	3937.10000	=	0	0	109	1	1
Chiliometre	=	39371.00000	=	0	4	213	1	10.2
Myriometre	=	393710.00000	=	6	1	156	0	6

MEASURES OF CAPACITY.

		Cubic Inches.		ENGLISH.			
				Tons.	*Hogs.*	*Wine Gal.*	*Pints.*
Millilitre	=	.06103					
Centilitre	=	.61028					
Decilitre	=	6.10280					
Litre	=	61.02800	=	0	0	0.	2.1133
Decalitre	=	610.28000	=	0	0	2.	5.1352
Hecatolitre	=	6102.80000	=	0	0	26.419	
Chiliolitre	=	61028.00000	=	1	0	12.19	
Myriolitre	=	610280.00000	=	10	1	58.9	

MEASURES OF WEIGHT.

		English Grains.		AVOIRDUPOIS.		
				Pound.	*Oun.*	*Dram.*
Milligramme	=	.0154				
Centigramme	=	.1544				
Decigramme	=	1.5444				
Gramme	=	15.4440				
Decagramme	=	154.4402	=	0	0	5.65
Hecatogramme	=	1544.4023	=	0	3	8.5
Chiliogramme	=	15444.0234	=	2	3	5
Myriogramme	=	154440.2344	=	22	1	2

Table shewing the Comparison between Grammes and Troy, French, and Nuremberg, Apothecary Grains.

Gramme.		*Troy.*		*Poids de Marc.*		*Nuremberg.*
1	=	15.444	=	18.883	=	16.128
2	=	30.888	=	37.766	=	32.256
3	=	46.332	=	56.648	=	48.384
4	=	61.776	=	75.530	=	64.512
5	=	77.220	=	94.413	=	80.641
6	=	92.664	=	113.296	=	96.769
7	=	108.108	=	132.179	=	112.897
8	=	123.552	=	151.062	=	129.026
9	=	138.996	=	169.944	=	145.154
10	=	154.440	=	188.827	=	161.282

Weights and Measures used in France before the Revolution.

WEIGHTS.

The Paris pound, poids de marc of Charlemagne, contains 9216 Paris grains; it is divided into 16 ounces, each ounce into 8 gros, and each gros into 72 grains. It is equal to 7561 English troy grains.

The English troy pound of 12 ounces contains 5760 English troy grains, and is equal to 7021 Paris grains.

The English avoirdupois pound of 16 ounces contains 7000 English troy grains, and is equal to 8538 Paris grains.

To reduce Paris grains to English troy grains, divide by - - - -	1.2189
To reduce English troy grains to Paris grains, multiply by - - -	
To reduce Paris ounces to English troy, divide by - - - -	1.015734
To reduce English troy ounces to Paris, multiply by - - - -	

Or the conversion may be made by means of the following tables:

Division of French Weights.

	Pound.		Ounces.		Drams.		Scruples.		Grains.		Troy gr.
Poids de Marc	1	=	16	=	128	=	384	=	9216	=	7561
Apothecary	1	=	12	=	96	=	288	=	6912	=	5670.5
			1	=	8	=	24	=	576	=	472.56
					1	=	3	=	72	=	59.073
							1	=	24	=	19.689
									1	=	0.82

To reduce English Weight Troy to Paris.

The English troy pound of 12 ounces = 7021.
The troy ounce . = 585.0833
The dram of 60 grains - = 73.1354
The penny-weight, or denier, of 24 grains - 29.2541
The scruple of 20 grains - - = 14.3784
The grain - - - = 1.2189
} Paris grains.

To reduce English Avoirdupois to Paris Weight.

The avoirdupois pound of 16 ounces, or 7000 troy grains - } = 8538.
The ounce - - - = 533.6250
} Paris grains.

Table shewing the Comparison between French and English Grains (Poids de Marc.)

French grs.	= *English grs.*		*English grs.*	= *French grs.*
1	0.8203		1	1.2189
2	1.6407		2	2.4378
3	2.4611		3	3.6568
4	3.2815		4	4.8757
5	4.1019		5	6.0947
6	4.9223		6	7.3136
7	5.7427		7	8.5325
8	6.5631		8	9.7515
9	7.3835		9	10.9704
10	8.2030		10	12.1890

LONG AND CUBICAL MEASURES.

To reduce Paris running feet, or inches, into English, multiply by - -
English running feet, or inches, into Paris, divide by -
} 1.065977

To reduce Paris cubic feet, or inches, to English, multiply by - - - - - -
English cubic feet, or inches, to Paris, divide by
} 1.211278

Or by means of the following tables:

To reduce Paris Long Measure to English.

The Paris royal foot of 12 inches - = 12.7977
The inch - - - - = 1.0664
The line, or 1-12th of an inch = .0888
The 1-12th of a line - - = .0074
} English inches.

To reduce English Long Measure to French.

The English foot	= 11.2596	Paris inches.
The inch	= .9383	
The 1-8th of an inch	= .1173	
The 1-10th	= .0938	
The line, or 1-12th	= .0782	

To reduce French Cube Measure to English.

The Paris cube foot	= 1.211278	English cubical feet, or	2093.088384	inches.
The cubic inch	= .000700		1.211278	

To reduce English Cube Measure to French[*].

The English cube foot, or 1728 cubical inches	= 1427.4864	French cubical inches.
The cubical inch	= .8260	
The cube tenth	= .0008	

MEASURE OF CAPACITY.

The Paris pint contains 58.145[†] English cubical inches, and the English wine-pint contains 28.875[‡] cubical inches; or, the Paris pint contains 2.0171082 English pints, and the English pint contains .49617 Paris pints; hence,

To reduce the Paris pint to the Paris, multiply by	2.0171082
To reduce the English pint to the Paris, divide by	

The septier of Paris is 7736 French, or 9370.45 English, cubical inches; and the muid is 92832 French, or 112445.4 English cubical inches.

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[*] To convert the weight of a French cubic foot, of any particular substance given in French grains, into the corresponding weight of an English cubic foot in English troy grains, multiply the French grains by 0.6173181, and the product is the number of English troy grains contained in an English cubic foot of the same substance.

[†] It is said by Belidor (*Archit. Hydrog.*) to contain 31 oz. 64 grains of water, which makes it 58.075 English inches; but as there is considerable uncertainty in the determinations of the weight of the French cubical measure of water, owing to the uncertainty of the standards made use of, it is better to abide by Mr. Everard's measure, which was made by the Exchequer standards, and by the proportions of the English and French foot, as established by the French Academy and Royal Society.

[‡] According to Baumé, the Paris pint contains 32 French ounces of water, at the temperature of 54.5° of Fahrenheit; which would make it equal to 59.729 English cubical inches.

Table shewing the Comparison between French and English Cubical Inches.

Cubic Inches.	
French =	*English.*
1	1.2136
2	2.4272
3	3.6408
4	4.8544
5	6.0681
6	7.2817
7	8.4953
8	9.7089
9	10.9225
10	12.136[illegible]

Cubic Inches.	
English =	*French.*
1	0.8239
2	1.6479
3	2.4719
4	3.2958
5	4.1198
6	4.9438
7	5.7677
8	6.5917
9	7.4157
10	8.2390

GERMAN.

COLOGNE WEIGHT.

Marc.		Ounces.		Drachms.		Pennyweights.		Grains.
1	=	8	=	64	=	256	=	6144
		1	=	8	=	32	=	768
				1	=	4	=	96
						1	=	24

NUREMBERG, OR APOTHECARIE'S WEIGHT.

Pound.		Ounces.		Drachms.		Scruples.		Grains.		Troy grs.
1	=	12	=	96	=	288	=	5760	=	5388
		1	=	8	=	24	=	480	=	460.5
				1	=	3	=	60	=	57.5
						1	=	20	=	19.2
								1	=	0.96

Swedish Weights and Measures, used by Bergman and Scheele.

The Swedish pound, which is divided like the English apothecary, or troy pound, weighs 6556 grains troy.

The kanne of pure water, according to Bergman, weighs 42250 Swedish grains, and occupies 100 Swedish cubical inches. Hence the kanne of pure water weighs 48088.719444 English troy grains, or is equal to 189.9413 English cubic inches; and the Swedish longitudinal inch is equal to 1.238435 English longitudinal inches.

From these data, the following rules are deduced:

1. To reduce Swedish longitudinal inches to English, multiply by 1.2384, or divide by 0.80747.
2. To reduce Swedish to English cubical inches, multiply by 1.9, or divide by 0.5265.

3. To reduce the Swedish pound, ounce, drachm, scruple, or grain, to the corresponding English troy denomination, multiply by 1.1382, or divide by .8786.

4. To reduce the Swedish kannes to English wine-pints, multiply by .1520207, or divide by 6.57804.

5. The lod, a weight sometimes used by Bergman, is the 32d part of the Swedish pound: therefore, to reduce it to the English troy pound, multiply by .03557, or divide by 28.1156.

Relation of the Pound Weight in different Countries of Europe to each other, in French Grains.

Warsaw - -	15288	Dantzic - -	8791
Vienna - -	10688	Madrid - -	8656
Amsterdam -	9258	Frankfort -	8650
Geneva - -	9234	Marseilles -	8054
Paris - -	9216	Stockholm -	8000
Lisbon - -	9212	London - -	7140
Strasburgh - -	9015	German apothecary	6733
Copenhagen -	8876	Florence and Rome	6386
Berlin - -	8816	Naples - -	6218
Manheim - -	8804.5	Genoa - -	6180
Hamburgh -	8799.5	Milan - -	5400
Cologne -	8796.5	Venice - -	5040

Tables of Specific Gravities.

METALS.

Platinum - -	23.000	Arsenic, sulphuret, red	3.225
Gold - -	19.361	——————— yellow	5.315
Tungsten - -	17.6	Iron - -	7.788
Mercury at —40° -	15.612	—— sulphuret -	4.518
——— at 47° -	13.545	—— super-sulphuret -	4.83
Sulphuret of ditto -	10.	Cobalt - -	7.700
Palladium - -	11.871	Tin - -	7.299
Rhodium - -	11.+	Zinc - -	6.861
Lead - -	11.352	Manganese - -	6.850
Sulphuret of ditto -	7.	Antimony - -	6.712
Silver - -	10.510	——— sulphuret -	4.368
—— sulphuret -	7.2	Tellurium - -	6.115
Bismuth - -	9.822		
——- sulphuret -	6.131		
Uranium - -	9.	INFLAMMABLES.	
Copper - -	8.895	Sulphur, native -	2.0332
Nickel - -	8.666	——- melted -	1.9907
Molybdenum - -	8.600	Phosphorus -	1.714
——— sulphuret	4.73	Diamond - -	3.5212
Arsenic - -	8.310	Charcoal - -	0.441

SALINE SUBSTANCES.

Sulphuric acid	2.125	
Nitric	1.504	
Muriatic	1.194	
Acetic	1.0626	
Red vinegar	1.025	
White ditto	1.014	
Distilled	1.010	
Phosphoric	1.5575	
Citric	1.0345	
Arsenious	1.8731	
Potass	1.7085	H
	4.6215	K
——— sulphate	2.298	Wal
	2.636	Wat
	2.4073	H
——— sulphite	1.586	V
——— nitrate	1.933	Wat
	1.900	Wal
	1.9369	H
	2.15	F
——— muriate	1.836	K
——— carbonate	2.012	H
	2.749	M
——— supertartrate	1.953	H
	1.8745	M
——— tartrate	1.5567	H
Soda	1.336	H
—— sulphate	2.246	Wal
	1.380	Wat
	1.4457	H
—— muriate	2.125	F
	2.120	K
	2.143	Wat
	2.200	H
—— subborate	1.740	K
	1.720	Wal

Soda, subborate	1.757	Wat
—— phosphate	1.333	H
—— subcarbonate	1.3591	H
	1.421	K
—— acetate	2.1	H
—— and potash tartrate	1.757	Wat
Ammonia, liquid	0.9054	D
——— muriate	1.450	Wat
	1.453	Wal
	1.420	K
——— carbonate	0.966	H
	1.824	K
	1.5026	M
	1.450	V
Lime	2.3908	K
	2.37	M
	1.5233	H
—— muriate	1.76	H
—— carbonate	2.7	
Magnesia	2.3298	K
	0.346	H
——— sulphate	1.6603	H
——— carbonate	0.2941	H
Barytes	4.	K
	2 374	H
——— muriate	2.8257	H
——— carbonate, native	4.331	
——— ——— artificial	3.763	
Alumina	2.000	K
	0.8200	H
Alum	1.7109	H
	1.719	Wal
	1.757	Wat
	1.738	F
	1.714	N
	1.726	M

METALLIC SALTS.

Mercury, muriate of	5.1398	H
	4.142	Wat
——— submuriate	7.1758	H
——— phosphate	4.9835	H
——— subsulphate	6.444	Wat
Copper, sulphate of	2.1943	H
	2.230	Wat
——— acetate	1.779	H
Iron, sulphate of	1.8399	H
	1.880	Wal
	1.812	Wat
——— ——— calcined	2.636	Wat

Lead, sulphate	1.8742	H
—— carbonate	7.2357	
—— acetate	2.345	H
Zinc, sulphate	2.3958	M
	1.933	Wat
	1.912	H
	1.712	N

D Davy. H Hassenfratz. K Kirwan. M Muschenbrock. Wal Wallerius. Wat Watson. F Fahrenheit. V Vauquelin. N Newton.

Table of Specific Gravities, directed by the Dublin Pharmacopœia.

Solution of carbonate of soda ready to crystallize	1220
Water of caustic kali	1100
——— caustic ammonia	936
——— carbonate of ammonia	1095
Sulphuric acid	1845
——— diluted	1090
Muriatic acid	1170
——— diluted	1080
Nitrous acid	1500
——— diluted	1280
Oxymuriatic alkaline water	1087
——— water	1003
Distilled vinegar	1006
Acetic acid	1070
Water of sulphuret of kali	1120
Proof spirit	840
Alcohol	815
Sulphuric ether	765
Nitrous ether	900
Spirit of nitrous ether	850

SOLUTIONS OF SALTS AT 42° FAHRENHEIT; WATSON.

	Saturated.	*In 12 Waters.*
Lime	1.001	
Arsenious acid	1.005	
Subborate of soda	1.010	
Muriate of mercury	1.037	
Alum	1.033	
Sulphate of soda	1.052	1.029
——— potass	1.054	
Muriate of soda	1.198	1 059
Arseniate of potass	1.184	
Muriate of ammonia	1.072	1.026
Carbonate of ditto	1.077	
Oxalate of ammonia (Thomson)	1.0186	
Nitrate of potass	1.095	1.050
Tartrate of potass and soda	1.114	
Sulphate of copper	1.150	1.052
——— iron	1.157	1.043
——— magnesia	1.218	
——— zinc	1.386	1.045
Subcarbonate of potass	1.534	

EXTRACTS, GUMS, RESINS,

Acacia prunus spinosa	1.5153	Arabic	1.4523
Aloes hepatic	1.3586	Arcanson	1.0857
——— socotrine	1.3796	Arecha (Catechu?)	1.4573
Alouchi	1.0604	Arnotto	0.5956
Amber yellow, transparent	1.0780	Asphaltum, cohesive	1.450 2.060
——— opaque	1.0855	——— compact	1.070 1.165
——— red	1.0834	Assafœtida	1.3275
——— green	1.0829	Baras	1.0441
Ambergris	0.7800 0.9263	Bdellium	1.1377
Ammoniac	1.2071	Benzoin	1.0924
Anime, oriental	1.0284	Bitumen of Judea	1.104
——— occidental	1.0426		

Cachibou	1.0640	Mastic	1.0742
Camphor	0.9887	Myrrh	1.3600
Caoutchouc	0.9335	Olibanum	1.1732
Caragna	1.1244	Opium	1.3365
Catechu	1.4573	Opoponax	1.6226
Cherry	1.4817	Resin of Jalap	1.2185
Copal, opaque	1.1398	Rosin	1.0727
—— transparent	1.0452	Sandarac	1.0920
Cork	0.2400	Sagapenum	1.2008
Dragon's blood	1.2045	Sarcocol	1.2684
Elemi	1.0682	Scammony of Aleppo	1.2354
Euphorbium	1.1244	——— Smyrna	1.2743
Galbanum	1.2120	Inspissated juice of St. John's wort	1.5263
Galipot	1.0819	Storax	1 1098
Gamboge	1.2216	Sugar, white	1.6060
Guaiac	1.2289	Tacamahaca	1.0463
Lac	1.1390	Tragacanth	1 8161
Honey	1.4500	Turpentine	0.991
Hypociste	1.5263	Wax, ouarouchi	0.8970
Liquorice	1.7228	—— bees	0.9648
Indigo	0.7690	—— white	0.9686
Ivy	1.2948	—— shoemakers	0.897
Labdanum	1.1862		

OILS.

Volatile.		*Fixed.*	
Cinnamon	1.044	Tallow	0.9419
Cloves	1.036	Fat of beef	0.9232
Lavender	0.894	—— mutton	0.9235
Mint	0.8982	—— veal	0.9342
Sage	0.9016	—— pork	0.9368
Thyme	0.9023	Naphtha	8.8475
Rosemary	0.9057	Butter	0.9423
Calamint	0.9116	Caiva butter	0.8916
Scurvy-grass	0.9427	Oil of filberts	0.916
Wormwood	0.9073	—— walnut	0.9227
Tansy	0.9949	—— hemp-seed	0.9258
Chamomile	0.8943	—— poppies	0.9238
Savine	0.9294	—— rape-seed	0.9193
Fennel	0.9294	—— lint-seed	0.9403
—— seed	1.0083	—— whale	0.9233
Coriander seed	0.8655	—— ben	0.9119
Caraway seed	0.9049	—— beechmast	0.9176
Dillseed	0.9128	—— cod-fish	0.9233
Anise seed	0.9867	—— olives	0.9153
Juniper	0.8577	—— almonds	0 9170
Turpentine	0.8697	Spermacceti	0.9433
Amber	0.8867		
Orange flower	0.8798		
Hyssop	0.8892		

WOODS, BARKS, &c.

Cinchona	0.7840	Mahogany	1.0630
Logwood	0.9130	Red saunders	1.1280
Madder	0.7650	Sassafras	0.4820

ALCOHOL, ETHERS.

Sulphuric	0.7396	Acetic	0.8664
Nitric	0.9088	Alcohol	0.8293
Muriatic	0.7296	Proof spirit	0.916

Table for reducing the Degrees of Baumé's Hydrometer to the Common Standard.

BAUME'S HYDROMETER FOR LIQUIDS LIGHTER THAN WATER.

Temperature 55° Fahrenheit, or 10° Reaumur.

Deg.	*Sp. Gr.*	*Deg.*	*Sp. Gr.*	*Deg.*	*Sp. Gr.*	*Deg.*	*Sp. Gr.*
10	1.000	18	.942	26	.892	34	.847
11	.990	19	.935	27	.886	35	.842
12	.982	20	.928	28	.880	36	.837
13	.977	21	.922	29	.874	37	.832
14	.970	22	.915	30	.867	38	.827
15	.963	23	.909	31	.871	39	.822
16	.955	24	.903	32	.856	40	.817
17	.949	25	.897	33	.852		

LIQUIDS HEAVIER THAN WATER.

Deg.	*Sp. Gr.*	*Deg.*	*Sp. Gr.*	*Deg.*	*Sp. Gr.*	*Deg.*	*Sp. Gr.*
0	1.000	21	1.170	42	1.414	63	1.779
3	1.020	24	1.200	45	1.455	66	1.848
6	1.040	27	1.230	48	1.500	69	1.920
9	1.064	30	1.261	51	1.547	72	2.000
12	1.089	33	1.295	54	1.594		
15	1.114	36	1.333	57	1.659		
18	1.140	39	1.373	60	1.717		

Comparative Weights of Gaseous Fluids.

	100 CUBIC INCHES.[*]		SPECIFIC GRAVITY.		
	French in French grains.	*English in Troy grains.*	*Standard.* *Water.*	*Air.*	
Water	37419.8		1000.	813.5	Lavoisier.
Ditto		25242.2	1000.	814.3	Shuckburgh.
Atmospheric air	46.		1.2293	1.	Lavoisier.
Ditto		31.	1.2279	1.	Shuck. Kirwan.
Oxygen	51.		1.365	1.11	Lavoisier.
Ditto		34.	1.35	1.09	Kirwan.
Ditto		35.09	1.39	1.13	Davy.
Ditto		33.82*			Allen & Pepys.
Nitrogen	44.44		1.19	0.965	Lavoisier.
Ditto		30.535	1.21	0.985	Kirwan.
Ditto		30.45	1.20	0.98	Davy.
Ammonia		18.16	0.715	0.586	Kirwan.
Ditto		18.67*			Allen & Pepys.
Hydrogen	3.5		0.0935	0.076	Lavoisier.
Ditto		2.613	0.1031	0.084	Kirwan.

[*] Barometer 30, thermometer 60.

	100 CUBIC INCHES.		SPECIFIC GRAVITY.		
			Standard		
	French, in French grains.	*English in Troy grains.*	*Water.*	*Air.*	
Hydrocarbonus oxide					
from camphor		21.	0.83	0.677	Cruickshank.
from stagnant water		20.66		0.666	Dalton.
from coal		20.2		0.650	Dalton.
from ether		20.	0.78	0.645	Cr.
from alcohol		16.	0.63	0.516	Cr.
from water over charcoal		14.5	0.573	0.467	Cr.
Olefiant gas		28.18		0.905	Deiman.
Vapour of alcohol		51.5*		2.100	Dalton.
——— ether		62.1†		2.250	Dalton.
Carbonic oxide		30.	1.185	0.965	Cr.
Carbonic acid		46.5	1.84	1.5	Kirwan.
Ditto		45.5	1.802	1.47	Davy.
Ditto		47.26‡			Allan & Pepys.
Nitrous oxide		50.1	1.985	1.615	Davy.
Nitric oxide		37.	1.465	1.193	Kirwan.
Ditto		34.3	1.36	1.105	Davy.
Nitric acid		76.	3.	2.425	Ditto.
Sulphuretted hydrogen		34.286	1.36	1.205	Kirwan.
Ditto		38.17		1.231	Thenard.
Sulphurous acid		70.215	2.75	2.24	Kirwan.
Muriatic acid	66		2.765	1.43	Brisson.
Ditto		59.8		1.929	Kirwan.

* Of temperature 190° Fahr. and force = 30 inches of mercury.

† Of temperature 100° Fahr. and force = 30 inches of mercury.

‡ Thermometer 60, barometer 30.

HEAT.

CORRESPONDENCE BETWEEN DIFFERENT THERMOMETERS.

Fahrenheit's thermometer is universally used in this kingdom. In it the range between the freezing and boiling points of water is divided into 180 degrees; and as the greatest possible degree of cold was supposed to be that produced by mixing snow and muriate of soda, it was made the zero; hence the freezing point became 32°, and the boiling point 212°.

The Centrigrade thermometer places the zero at the freezing point, and divides the range between it and the boiling point into 100°. This has long been used in Sweden, under the title of Celsius's thermometer.

Reaumeur's thermometer, which was formerly used in France, divides the space between the freezing and boiling of water into 80°, and places the zero at the freezing point.

Wedgwood's pyrometer is only intended to measure very high temperatures. Its zero corresponds with 1077° of Fahrenheit's, and each degree of Wedgwood is equal to 130 of Fahrenheit.

De Lisle's thermometer is used in Russia. The graduation begins at the boiling point, and increases towards the freezing point. The boiling point is marked 0, and the freezing point 150.

Therefore $180° F = 100° C = 80° R = 150° D = \frac{18}{13} W$.

Formulæ.

1. To reduce centigrade degrees to those of Fahrenheit, multiply by 9, and divide by 5, and to the quotient add 32, that is, $\frac{C \times 9}{5} + 32 = F$.

2. To reduce Fahrenheit's degrees to centigrade, $\frac{F - 32 \times 5}{9} = C$.

3. To reduce Reaumur's to Fahrenheit's, $\frac{R \times 9}{4} + 32 = F$.

4. To convert Fahrenheit to Reaumur, $\frac{F - 32 \times 4}{9} = R$.

5. To reduce De Lisle's degrees under the boiling point, we have $212 - \frac{D \times 6}{5} = F$. To reduce those above the boiling point, $212 + \frac{D \times 6}{5} = F$.

6. And, inversely, to reduce Fahrenheit's degrees to De Lisle's, under the boiling point, $\frac{1060 - F \times 5}{6} = -D$; above the boiling point, $\frac{F \times 5 - 1060}{6} = +D$.

7. To reduce Wedgwood's degrees to those of Fahrenheit, $W \times 130 + 1077 = F$.

8. Inversely, to reduce Fahrenheit to Wedgwood, $\frac{F - 1077}{130} = W$.

Table of the Effects of Heat.

1. FREEZING POINTS OF LIQUIDS.

Reaum.	*Cent.*	*Fahren.*	
		—90	Greatest artificial cold observed.
—44	—66	—55	Strongest nitric acid freezes (Cavendish)
—35	—43	—46	Ether and liquid ammonia.
—32	—39	—39	Mercury
—30	—37	—36	Sulphuric acid (Thomson)
—23	—30	—22	Acetous acid.
—19	—24	—11	2 Alcohol, 1 water
—17	—14	—7	Brandy. Snow 3 parts, salt 2
—14	—17	+1	Strongest sulphuric acid (Cavendish)
—7	—9	16	Oil of turpentine (Margueron)
—5	—6	20	Strong wines
—4	—5	23	Fluoric acid
			Oils, bergamot and cinnamon
—3	—4	25	Human blood
—2	—2.5	28	Vinegar
—1	--12.5	30	Milk
0	0	32	Oxymuriatic acid
			Water
+2	+2.5	36	Olive oil
6	7	45	Sulphuric acid, specific gravity 1.78 (Keir)
14	17	64	Oil of aniseeds, 50 (Thomson)
			2. MELTING POINTS OF SOLIDS.
4	5	40.	Equal parts sulphur and phosphorus
22	28	82	Adipocire of muscle
29	36	97	Lard (Nicolson)
30	37	99	Phosphorus (Pelletier)
32	40	104	Resin of bile
34	4	109	Myrtle wax (Cadet)
36	45	112	Spermaceti (Bostock)
42	53	127	Tallow (Nicolson) 92 (Thomson)
49	61	142	Bees wax
50	63	145	Ambergris (La Grange)
55	79	155	Bleached wax (Nicolson)
80	100	212	Bismuth 5 parts, tin 3, lead 2, 210 (Dalton)
89	111	234	Sulphur (Hope) 212 (Fourcroy) 185 (Kirwan)
90	116	235	Adipocire of biliary calculi (Fourcroy)
112	140	283	Tin and bismuth, equal parts
120	150	303	Camphor
134	168	334	Tin 3, lead 2; or tin 2, bismuth 1
182	227	442	Tin (Crichton) 413 (Irvine)
190	238	460	Tin 1, lead 4
197	248	476	Bismuth (Irvine)
258	325	612	Lead (Crichton) 594 (Irvine) 540 (Newton)

Reaum.	*Cent.*	*Fahren.*		*Wedg.*
297	371	700	Zinc	
945	432	809	Antimony	
1678	2100	3807	Brass	21
2024	2530	4587	Copper	27
2082	2602	4717	Silver	28
2313	2780	5237	Gold	32
7475	9850	17977	Cobalt, cast iron	130
9131	11414	20577	Nickel	150
9325	11680	21097	Soft nails	154
9602	12801	21637	Iron	158
9708	12136	21877	Manganese	160
10280	12857	23177	Platina, Tungsten, Molybdena, Uranium, Titanium, &c.	170+

3. SOLIDS AND LIQUIDS VOLATILIZED.

29	36	98	Ether
48	60	140	Liquid ammonia
50	63	145	Camphor (Venturi)
61	77	170	Sulphur (Kirwan)
64	80	176	Alcohol 174 (Black)
80	100	212	Water and essential oils
83	104	219	Phosphorus (Pelletier)
88	110	230	Muriate of lime (Dalton)
93	116	242	Nitrous acid
96	120	248	Nitric acid
112	140	283	White oxide of arsenic
226	282	540	Arsenic
232	290	554	Phosphorus in close vessels
239	299	570	Sulphur
248	310	590	Sulphuric acid (Dalton) 546 (Black)
252	315	600	Linseed oil, Sulphur (Davy)
279	350	660	Mercury (Dalton) 644 (Secondat) 600 (Black)

4. MISCELLANEOUS EFFECTS OF HEAT.

—54	—68	—90	Greatest cold produced by Mr. Walker
—36	—44	—50	Natural cold observed at Hudson's Bay
—24	—30	—23	Observed on the surface of the snow at Glasgow, 1780
—20	—25	—14	At Glasgow, 1780
—14	—18	0	Equal parts, snow and salt
+5	+6	+43	Phosphorus burns slowly
12	15	59	Vinous fermentation begins
15	18	66	to 135, Animal putrefaction
19	24	75	to 80, Summer heat in Britain
20	25	77	Vinous fermentation rapid, acetous begins
21	26	80	Phosphorus burns in oxygen, 104 (Gottling)
25	31	88	Acetification ceases, phosphorus ductile

Reaum.	*Cent.*	*Fahren.*		*Wedg.*
28	35	96	to 100, Animal temperature	
33	41	107	Feverish heat	
40	50	122	Phosphorus burns vividly (Fourcroy) 148 (Thomson)	
44	54	130	Ammonia disengaged from water	
59	74	165	Albumen coagulates 156 (Black)	
120	150	303	Sulphur burns slowly	
269	335	635	Lowest heat of ignition of iron in the dark	
315	384	750	Iron bright in the dark	
341	427	800	Hydrogen burns, 1000 (Thomson)	
342	428	802	Charcoal burns (Thomson)	
380	475	884	Iron red in twilight	
448	560	1050	Iron red hot in a common fire	
462	577	1077	Iron red in daylight	1
564	705	1300	Azotic gas burns	+ 2
737	986	1807	Enamel colours burned	6
1451	1814	2897	Diamond burns (M'Kenzie) 5000 (Morveau)	14
2313	2780	5237	Settling heat of plate glass	29
2880	3580	6507	Delft ware fired	40
3750	4680	8480	Working heat of plate glass	57
4450	5610	10177	Flint glass furnace	70
5370	6770	12257	Cream-coloured ware fired	86
5800	7330	13297	Worcester china vitrified	94
6270	7850	14337	Stone ware fired	102
6520	8150	14727	Chelsea china fired	105
6925	8650	15637	Derby china fired	112
7025	8770	15897	Flint glass furnace greatest heat	114
7100	8880	16007	Bow china vitrified	121
7460	9320	16807	Plate glass greatest heat	124
7650	9600	17327	Smith's forge	125
9131	11414	20577	Hessian crucible fused	150
11106	13900	25127	Greatest heat observed	185
			Extremity of Wedgwood	240

TABLES,

Exhibiting a collective View of all the Frigorific Mixtures, contained in Mr. Walker's Publication, 1808, *communicated by the Author.*

TABLE I.

This Table consists of frigorific mixtures, having the power of *generating*, or *creating* cold, *without the aid of ice*, sufficient for all useful and philosophical purposes, in any part of the world, at any season.

Frigorific Mixtures, *without Ice.*

Mixtures.	Thermometer sinks.	Degr. of cold produced.
Muriate of ammonia 5 parts Nitrate of potash - 5 Water - - 16	From +50° to +10°	40
Muriate of ammonia 5 parts Nitrate of potash 5 Sulphate of soda - 8 Water - - 16	From +50 to +1	46
Nitrate of ammonia 1 part Water - - 1	From +50 to +4	46
Nitrate of ammonia 1 part Carbonate of soda 1 Water - - 1	From +50 to —7	57
Sulphate of soda - 3 parts Diluted nitric acid 2	From +50 to —3	53
Sulphate of soda - 6 parts Muriate of ammonia 4 Nitrate of potash - 2 Diluted nitric acid 4	From +50 to —10	60
Sulphate of soda - 6 parts Nitrate of ammonia 5 Diluted nitric acid 4	From +50 to —14	64
Phosphate of soda 9 parts Diluted nitric acid 4	From +50 to —12	62
Phosphate of soda 9 parts Nitrate of ammonia 6 Diluted nitric acid 4	From +50 to —21	71
Sulphate of soda - 8 parts Muriatic acid - 5	From +50 to 0	50
Sulphate of soda - 5 parts Diluted sulphuric acid 4	From +50 to +3	47

N. B. If the materials are mixed at a *warmer* temperature than that expressed in the table, the effect will be proportionally *greater*; thus, if the most powerful of these mixtures be made when the air is +85°, it will sink the thermometer to +2°.

TABLE II.

This Table consists of frigorific mixtures composed of *ice*, with chemical salts and acids.

Frigorfic Mixtures, *with Ice.*

Mixtures.		Thermometer sinks.	Degr. of cold produced.
Snow, or pounded ice Muriate of soda -	2 parts 1	*From any Temperature* to —5°	*
Snow, or pounded ice, Muriate of soda, - Muriate of ammonia	5 parts 2 1	to —12	*
Snow, or pounded ice, Muriate of soda - Muriate of ammonia Nitrate of potash -	24 parts 10 5 5	to —18	*
Snow, or pounded ice Muriate of soda - Nitrate of ammonia	12 parts 5 5	to —25	*
Snow - - Diluted sulphuric acid	3 parts 2	From +32 to —23	55
Snow - - Muriatic acid -	8 parts 5	From +32 to —27	59
Snow - - Diluted nitric acid -	7 parts 4	From +32 to —30	62
Snow - - Muriate of lime -	4 parts 4	From +32 to —40	72
Snow - - Chryst. muriate of lime	2 parts 3	From +32 to —50	82
Snow - - Potash - -	3 parts 4	From +32 to —51	83

N. B. The reason for the *omissions* in the last column of this table is, the thermometer sinking in these mixtures to the degree mentioned in the preceding column, *and never lower*, whatever may be the temperature of the materials at mixing.

TABLE III.

This Table consists of frigorific mixtures selected from the foregoing tables, and *combined*, so as to *increase* or *extend* cold to the extremest degrees.

Combinations of Frigorific Mixtures.

Mixtures.	Thermometer sinks.	Degr. of cold produced.
Phosphate of soda - 5 parts Nitrate of ammonia 3 Diluted nitric acid - 4	From 0° to —34°	34
Phosphate of soda - 3 parts Nitrate of ammonia 2 Diluted mixed acids 4	From —34 to —50	16
Snow - - 3 parts Diluted nitric acid - 2	From 0 to —46	46
Snow - - 8 parts Diluted sulphuric acid 3 } Diluted nitric acid - 3 }	From —10 to —56	46
Snow - - 1 part Diluted sulphuric acid 1	From —20 to —60	40
Snow - - 3 parts Muriate of lime - 4	From +20 to —48	68
Snow - - 3 parts Muriate of lime - 4	From +10 to —54	64
Snow - - 2 parts Muriate of lime - 3	From —15 to —68	53
Snow - - 1 part Chryst. muriate of lime 2	From 0 to —66	66
Snow - - 1 part Chryst. muriate of lime 3	From —40 to —73	33
Snow - - 8 parts Diluted sulphuric acid 10	From —68 to —91	23

N. B. The materials in the first column are to be cooled, previously to mixing, to the temperature required, by mixtures taken from either of the preceding tables.

TALES OF SIMPLE AFFINITY.

OXYGEN.

Carbon,
Manganese,
Zinc,
Iron,
Tin,
Antimony,
Hydrogen,
Phosphorus,
Sulphur,
Arsenic,
Nitrogen,
Nickel,
Cobalt,
Copper,
Bismuth,
Caloric?
Mercury,
Silver,
Arsenous acid,
Nitric oxide,
Gold,
Platinum,
Carbonic oxide,
Muriatic acid,
White oxide of manganese,
White oxide of lead.

OXYGEN[*]:

Titanium,
Manganese,
Zinc,
Iron,
Tin,
Uranium,
Molybdenum,
Tungsten,
Cobalt,
Antimony,
Nickel,
Arsenic,
Chromium,
Bismuth,
Lead,
Copper,
Tellurium,
Platinum,
Mercury,
Silver,
Gold.

CARBON.

Oxygen,
Iron,
Hydrogen.

NITROGEN.

Oxygen,
Sulphur?
Phosphorus,
Hydrogen.

HYDROGEN.

Oxygen,
Sulphur,
Carbon,
Phosphorus,
Nitrogen.

SULPHUR.
PHOSPHORUS?

Potass,
Soda,
Iron,
Copper,
Tin,
Lead,
Silver,
Bismuth,
Antimony,
Mercury,
Arsenic,
Molybdenum.

POTASS, SODA, AND AMMONIA.

Acids. Sulphuric,
  Nitric,
  Muriatic,
  Phosphoric,
  Fluoric,
  Oxalic,
  Tartaric,
  Arsenic,
  Succinic,
  Citric,
  Lactic,
  Benzoic,
  Sulphurous,
  Acetic,
  Mucic,
  Boracic,
  Nitrous,
  Carbonic,
  Prussic,
Oil,
Water,
Sulphur.

BARYTA.

Acids. Sulphuric,
  Oxalic,
  Succinic,
  Fluoric,
  Phosphoric,
  Mucic,
  Nitric,
  Muriatic,
  Suberic,
  Citric,
  Tartaric,
  Arsenic,
  Lactic,
  Benzoic,
  Acetic,
  Boracic,
  Sulphurous,
  Nitrous,
  Carbonic,
  Prussic,
Sulphur,
Phosphorus,
Water,
Fixed oil.

STRONTIA.

Acids. Sulphuric,
  Phosphoric,
  Oxalic,
  Tartaric,
  Fluoric,
  Nitric,
  Muriatic,
  Succinic,
  Acetic,
  Arsenic,
  Boracic,
  Carbonic,
Water.

LIME.

Acids. Oxalic,
  Sulphuric,
  Tartaric,
  Succinic,
  Phosphoric,
  Mucic,
  Nitric,
  Muriatic,
  Suberic,
  Fluoric,
  Arsenic,
  Lactic,
  Citric,
  Malic,
  Benzoic,
  Acetic,
  Boracic,
  Sulphurous,
  Nitrous,
  Carbonic,
  Prussic,
Sulphur,
Phosphorus,
Water,
Fixed oil.

MAGNESIA.

Acids. Oxalic,
  Phosphoric,
  Sulphuric,
  Fluoric,
  Arsenic,
  Mucic,
  Succinic,
  Nitric,
  Muriatic,
  Tartaric,
  Citric,
  Malic?
  Lactic,
  Benzoic,
  Acetic,
  Boracic,
  Sulphurous,
  Nitrous,
  Carbonic,
  Prussic,
Sulphur.

ALUMINA.

Acids. Sulphuric,
  Nitric,
  Muriatic,
  Oxalic,
  Arsenic,
  Fluoric,

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[*] Vauquelin's Table of the affinity of the metals for oxygen, according to the difficulty with which their oxides are decomposed by heat.

Tables of Simple Affinity,—Continued.

Acids. Tartaric,
Succinic,
Mucic,
Citric,
Phosphoric,
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic.

SILICA.

Acid. Fluoric,
Potass.

OXIDE OF PLATINUM.

OXIDE OF GOLD[a].

Acids. Gallic,
Muriatic,
Nitric,
Sulphuric,
Arsenic,
Fluoric,
Tartaric,
Phosphoric,
Oxalic,
Citric,
Acetic,
Succinic,
Prussic,
Carbonic,
Ammonia.

OXIDE OF SILVER.

Acids. Gallic,
Muriatic,
Oxalic,
Sulphuric,
Mucic,
Phosphoric,
Sulphurous,
Nitric,
Arsenic,
Fluoric,
Tartaric,
Citric,
Lactic,
Succinic,
Acids. Acetic,
Prussic,
Carbonic,
Ammonia.

OXIDE OF MERCURY.

Acids. Gallic,
Muriatic,
Oxalic,
Succinic,
Arsenic,
Phosphoric,
Sulphuric,
Mucic,
Tartaric,
Citric,
Malic,
Sulphurous,
Nitric,
Fluoric,
Acetic,
Benzoic,
Boracic,
Prussic,
Carbonic.

OXIDE OF LEAD.

Acids. Gallic,
Sulphuric,
Mucic,
Oxalic,
Arsenic,
Tartaric,
Phosphoric,
Muriatic,
Sulphurous,
Suberic,
Nitric,
Fluoric,
Citric,
Malic,
Succinic,
Lactic,
Acetic,
Benzoic,
Boracic,
Prussic,
Carbonic,
Fixed oils,
Ammonia.

OXIDE OF COPPER.

Acids. Gallic,
Oxalic,
Tartaric,
Muriatic,
Sulphuric,
Mucic,
Nitric,
Arsenic,
Phosphoric,
Succinic,
Fluoric,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic,
Fixed alkalies,
Ammonia,
Fixed oils.

OXIDE OF ARSENIC.

Acids. Gallic,
Muriatic,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Phosphoric,
Fluoric,
Succinic,
Citric,
Acetic,
Prussic,
Fixed alkalies,
Ammonia,
Fixed oils,
Water.

OXIDE OF IRON.

Acids. Gallic,
Oxalic,
Tartaric,
Camphoric,
Sulphuric,
Mucic,
Muriatic,
Nitric,
Phosphoric,
Arsenic,
Acids. Fluoric,
Succinic,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic.

OXIDE OF TIN[b].

Acids. Gallic,
Muriatic,
Sulphuric,
Oxalic,
Tartaric,
Arsenic,
Phosphoric,
Nitric,
Succinic,
Fluoric,
Mucic,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Ammonia,

OXIDE OF ZINC.

Acids. Gallic,
Oxalic,
Sulphuric,
Muriatic,
Mucic,
Nitric,
Tartaric,
Phosphoric,
Citric,
Succinic,
Fluoric,
Arsenic,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic,
Fixed alkalies,
Ammonia.

OXIDE OF ANTIMONY.

Acids. Gallic,
Muriatic,

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[a] Omitting the oxalic, citric, succinic, and carbonic, and adding sulphuretted hydrogen after ammonia.

[b] Bergmann places the tartaric before the muriatic.

Tables of Simple Affinity,—Continued.

Acids. Benzoic,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Mucic,
Phosphoric,
Citric,
Succinic,
Fluoric,
Arsenic,
Lactic,
Acetic,
Boracic,
Prussic,
Fixed alkalies,
Ammonia.

SULPHURIC ACID.
PRUSSIC[a].

Baryta,
Strontia,
Potass,
Soda,
Lime,
Magnesia,
Ammonia,
Glucina,
Gadolina,
Alumina,
Zirconia,
Metallic oxides.

SULPHUROUS ACID.
SUCCINIC[b].

Baryta,
Lime,
Potass,
Soda,
Strontia,
Magnesia,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic oxides.

PHOSPHORIC ACID.
CARBONIC[c].

Baryta,
Strontia,
Lime,
Potass,
Soda,
Ammonia,
Magnesia,
Glucina,
Alumina,
Zirconia,
Metallic oxides,
Silica.

PHOSPHOROUS ACID[d].

Lime,
Baryta,
Strontia,
Potass,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic oxides.

NITRIC ACID.
MURIATIC[e].

Baryta,
Potass,
Soda,
Strontia,
Lime,
Magnesia,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic oxides.

FLUORIC ACID.
BORACIC[f].
ARSENIC[g].
TUNGSTIC.

Lime,
Baryta,
Strontia,
Magnesia,
Potass,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Silica,

ACETIC ACID.
LACTIC, SUBERIC.

Baryta,
Potass,
Soda,
Strontia,
Lime,
Ammonia,
Magnesia,
Metallic oxides,
Glucina,
Alumina,
Zirconia.

OXALIC ACID.
TARTARIC.
CITRIC[h].

Lime,
Baryta,
Strontia,
Magnesia,
Potass,
Soda,
Ammonia,
Alumina,
Metallic oxides,
Water,
Alcohol.

BENZOIC ACID.

White oxide of arsenic,
Potass,
Soda,
Ammonia,
Baryta,
Lime,
Magnesia,
Alumina,

CAMPHORIC ACID.

Lime,
Potass,
Soda,
Baryta,
Ammonia,
Alumina,
Magnesia.

FIXED OILS.

Lime,
Baryta,
Potass,
Soda,
Magnesia,
Oxide of mercury,
Other metallic oxides,
Alumina.

ALCOHOL.

Water,
Ether,
Volatile oil,
Alkaline sulphurets.

SULPHURETTED HYDROGEN.

Baryta,
Potass,
Soda,
Lime,
Ammonia,
Magnesia,
Zirconia.

---

[a] With the omission of all after ammonia.

[b] Ammonia should come before magnesia, and strontia, glucina, and zirconia should be omitted.

[c] Magnesia should stand above ammonia, and alumina and silica should be omitted.

[d] Ammonia should stand above magnesia.

[e] Silica should be omitted, and instead of it water and alcohol be inserted.

[f] Except silica.

[g] With the omission of strontia, metallic oxides, glucina, and zirconia.

[h] Zirconia after alumina.

Cases of Mutual Decomposition.

1. FROM SIMPLE AFFINITY.

Sulphate of potass	with	Muriate of baryta
———— soda	—	Nitrate of potass
———— ammonia	—	Muriate of soda
———— magnesia	—	Carbonate of potass
Super-sulphate of alumina	—	Muriate of lime
Nitrate of potass	—	———— baryta
———— ammonia	—	Phosphate of soda
Muriate of baryta	—	All the sulphates and nitrates
———— soda	—	Carbonate of potass
———— lime	—	Sub-borate of soda
———— ammonia	—	Carbonate of potass
Phosphate of soda	—	Muriate of ammonia
Sub-borate of soda	—	Carbonate of potass
Nitrate of silver	—	Muriate of soda
Acetate of lead	—	Citrate of potass
Sulphate of mercury	—	Muriate of soda
Soap of potass	—	———— soda
———— soda	—	Sulphate of lime

2. FROM COMPOUND AFFINITY.

Sulphate of baryta	with	Carbonate of potass
———— baryta	—	———— soda
———— potass	—	Muriate of lime
———— soda	—	Ditto
Muriate of baryta	—	Phosphate of soda
Ditto	—	Sub-borate of soda
Ditto	—	Carbonate of potass
Ditto	—	———— soda
Ditto	—	———— ammonia
Muriate of lime	—	———— ammonia
Phosphate of soda	—	———— lime
Acetate of lead	—	Sulphate of zinc
Ditto	—	Nitrate of mercury.

Cases of Disposing Affinity.

The formation of water by the action of the sulphuric acid on the compound oxides.

The oxidation of metals by water, in consequence of the presence of an acid.

Table of Incompatible Salts[*].

SALTS	INCOMPATIBLE WITH
1. Fixed alkaline sulphates	Nitrates of lime and magnesia, Muriates of lime and magnesia.
2. Sulphate of lime -	Alkalies, Carbonate of magnesia, Muriate of barytes.
3. Alum - -	Alkalies, Muriate of barytes, Nitrate, muriate, carbonate of lime, Carbonate of magnesia.
4. Sulphate of magnesia	Alkalies, Muriate of barytes, Nitrate and muriate of lime.
5. Sulphate of iron -	Alkalies, Muriate of barytes, Earthy carbonates.
6. Muriate of barytes -	Sulphates, Alkaline carbonates, Earthy carbonates.
7. Muriate of lime -	Sulphates, except of lime, Alkaline carbonates, Carbonate of magnesia.
8. Muriate of magnesia -	Alkaline carbonates, Alkaline sulphates.
9. Nitrate of lime -	Alkaline carbonates, Carbonates of magnesia and aluminæ, Sulphates, except of lime.

Quantity of real Acid taken up by pure Alkalies and Earths.
(Kirwan).

100 *Parts.*	*Sulphuric.*	*Nitric.*	*Muriatic.*	*Carbonic Acid.*
Potash	82.48	84.96	56.3	105. almost.
Soda	127.68	135.71	73.41	66.8.
Ammonia	383.8	247.82	171.	Variable.
Baryta	50.	56.	31.8	282.
Strontia	72.41	85.56	46.	43.2
Lime	143.	179.5	84.488	81.81
Magnesia	172.64	210.	111.35	200. Fourcroy.
Alumine	150.9	.		335. nearly, Bergman.

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[*] That is, salts which cannot exist together in solution, without mutual decomposition.

Quantity of Alkalies and Earths taken up by 100 *parts of real Sulphuric, Nitric, Muriatic, and Carbonic Acids, saturated. (Kirwan.)*

100 *Parts.*	*Potash.*	*Soda.*	*Ammonia.*	*Baryt.*	*Strontia.*	*Lime.*	*Mag.*
Sulphuric,	121.48	78.82	26 05	200.	138.	70.	57.92
Nitrous,	117.7	73.3	40.35	178.12	116.86	55.7	47.64
Muriatic,	177.6	136.2	58.18	314.16	216 21	118.3	898.
Carbonic,	95.1	149.6		354.5	231. +	122.	50.

Table of the respective quantities of Acid and Base required to neutralize each other, calculated by Fischer, from Richter's Experiments.

BASES.		ACIDS.	
Alumine	525	Fluoric	427
Magnesia	615	Carbonic	577
Ammonia	672	Sebacic	706
Lime	793	Muriatic	712
Soda	859	Oxalic	755
Strontites	1329	Phosphoric	979
Potash	1605	Formic	988
Barytes	2222	Sulphuric	1000
		Succinic	1209
		Nitric	1405
		Acetic	1480
		Citric	1563
		Tartaric	1694

Table, shewing the Maximum Quantity of Oxygen taken up by different Substances.

SIMPLE COMBUSTIBLES.

100 Hydrogen unite with	597.7	Oxygen;
100 Carbon	257.	
100 Azote	236.	
100 Muriatic acid	194.	
100 Phosphorus	154.	
100 Sulphur	71.3	

METALS.

100 Chrome combine with	200.	Oxygen.
100 Iron	92.3	
100 Manganese	66.	
100 Arsenic	53.	
100 Tin	38.8	
100 Antimony	30.	
100 Zinc	25.	
100 Copper		
100 Lead		
100 Tungsten		
100 Mercury	17.6	
100 Platina	15.	
100 Silver	12.8	
100 Bismuth	12.	
100 Gold	10.	

Allen and Pepys, 1807, composition of 100 carbonic acid, calculated,

	By carbonic acid.	By oxygen.
Boxwood charcoal -	28.92	28.77
1st Experment, diamond -	28.95	28.81
2d Ditto, ditto - -	28.82	28.72
Stone coal - -	28.20	28.77
Plumbago - -	28.46	28.46
Mean	28.67	28.60

Table, shewing the Composition of Salts, chiefly from KIRWAN.

SALTS.	COMPONENT PARTS.			STATE.
	BASIS.	ACID.	WATER.	
Carbonate of potash	11.	43.	16.	Crystallized.
Pearl-ash	60.	30.	6.	Dry.
Carbonate of soda	21.58	14.42	64.	Fully crystallized.
ditto	59.86	40.05		Desiccated.
barytes	78.	22.		Natural or ignited.
strontian	69.5	30.		Natural or ignited.
lime	55.	45.		Natural if pure, or artificial ignited.
ditto	56.	44.		Crystallized, Allen and Pepys.
magnesia	25.	50.	25.	
common ditto	45.	34.	21.	Dried at 80°.
Sulphate of potash	54.8	45 2		Dry.
soda	18.48	23.52	58.	Fully crystallized.
ditto	44.	56.		Desiccated at 700°.
ammonia	14.24	54.66	31.1	
barytes	66.66	33.33		Natural and pure, artificial ignited.
strontian	58.	42.		Natural and pure, artificial ignited.
lime	32.	46.	22.	Dried at 66°.
ditto	35.23	50.39	14.38	Dried at 170°.
ditto	38.81	55.84	5.35	Ignited.
ditto	41.	59.		Incandescent.
magnesia	17.	29.35	53.65	Fully crystallized.
ditto	36.68	63.32		Desiccated.
Alum	12. ignited	17.66	51. of crystall. +19.24 in the earth.	Crystallized.
Ditto	63.75	36.25		Desiccated at 700°.
Nitrate of potash	51.8	44.	4.2 of composition	Dried at 70°.
soda	10.58	53.21	6.21 of composition	Dried at 400°.

Table, shewing the Composition of Salts.—Continued.

	COMPONENT PARTS.			
SALTS.	BASIS.	ACID.	WATER.	STATE.
Nitrate of soda	42.34	57.55		Ignited.
ammonia	23.	57.	20.	
barytes	57.	32.	11.	Crystallized.
strontian	36.21	31.07	32.72	Crystallized.
lime	32.	57.44	10.56	Well dried, that is, in air.
magnesia	22.	46.	22.	Crystallized.
Muriate of potash	64.	36.		Dried at 80°.
soda	53.	47. aqueous, 38.88 real		Dried at 80°.
ditto	54.	46.	0.	Red hot, Dr. Marcet.
ammonia				Crystallized.
ditto	25.	42.75	3·225	Sublimed.
barytes	64.	20.	16.	Crystallized.
ditto	76.2	23.8		Desiccated.
strontian	40.	18.	42.	Crystallized.
ditto	69.	31.		Desiccated.
lime	50.	42.	8.	Red hot.
ditto	50.77	49.23	10.	Red hot, Dr. Marcet.
magnesia	31.07	34.59	34·34	Sensibly dry.
ditto	43.99	59.01	0	Desiccated, Dr. Marcet.
silver	80.95	19·05		Red hot, ditto.
Oxalate of ammonia	25.53	74·45		Dr. Thomson.
magnesia	26.32	73·68		
soda	36·37	63·63		
lime	37·50	62·50		
potass	54·13	44·87		
strontian	60·23	39·77		
barytes	58.84	41.16		

Colour of the Precipitates thrown down from Metallic Solutions by various Re-agents. Henry.

Metal.	*Prussiated Alkalies.*	*Tincture of Galls.*	*Water impregnated with Sulphuretted Hydrogen.*	*Hydro-Sulphurets.*
Gold	Yellowish-white	Solution turned green Precip. brown of reduced gold	Yellow	Yellow
Platina	No precip.; but an orange one by pruss. of mercury	Dark-green, becoming paler	Precipitated in a metallic state	
Silver	White	Yellowish-brown	Black	Black
Mercury	White changing to yellow	Orange-yellow	Black	Brownish-black
Palladium	Olive*. Deep orange †		Dark-brown	Dark-brown
Rhodium	No Precip.			No precip.
Iridium	No precip. Colour discharged	No precip. Colour of solutions discharged		
Osmium		Purple, changing to deep vivid blue		
Copper	Bright reddish-brown	Brownish	Black	Black
Iron 1. Green salts	White, changing to blue	No precip.	Not precip.	Black
Iron 2. Red salts	Deep blue	Black		

* Chenevix. † Wollaston.

Colour of Precipitates, &c.—Continued.

Metals.	*Prussiated Alkalies.*	*Tincture of Galls.*	*Water impregnated with Sulphuretted Hydrogen.*	*Hydro-Sulphurets.*
Nickel	Green	Greyish-white	Not precip.	Black
Tin	White	No precip.	Brown	Black
Lead	White	White	Black	Black
Zinc	White	No precip.	Yellow	White
Bismuth	White	Orange	Black	Black
Antimony	White	A white oxide merely from dilution	Orange	Orange
Tellurium	No precip.	Yellow		Blackish
Arsenic	White	Little change	Yellow	Yellow
Cobalt	Brownish-yellow	Yellowish white	Not precip.	Black
Manganese	Yellowish-white	No precip.	Not precip.	White
Chrome	Green	Brown		Green
Molybdena	Brown	Deep-brown	Brown	
Uranium	Brownish-red	Chocolate		Brownish-yellow
Tungsten				
Titanium	Grass-green, with a tinge of brown.	Reddish-brown	Not precip.	Grass-green
Columbium	Olive	Orange		Chocolate
Tantalium				
Cerium		Yellowish		Brown, becoming deep green

Table of the Solubility of Saline and other Substances, in 100 *Parts of Water, at the Temperature of* 60° *and* 212°.

ACIDS.

Sulphuric	unlimited.	unlimited.
Nitric	do.	do.
Acetic	do.	do.
Prussic	do.	do.
Phosphoric	very soluble.	
Tartaric		
Malic		
Lactic		
Laccic		
Arsenic	150	
Arsenious acid	1.25	6.6
Citric	133	200
Oxalic	50	100
Gallic	8.3	66
Boracic		2
Mucic	0.84	1.25
Succinic	4 1.04	50
Suberic	0.69	50
Camphoric	1.04	8.3
Benzoic	0.208	4.17
Molybdic		0.1
Chromic, unknown.		
Tungstic, insoluble.		

SALIFIABLE BASES.

Potass	50	
Soda, very soluble.		
Baryta	5,	50
——— crystallized	57	unlimited.
Strontia	0.6	
——— crystallized	1.9	50
Lime	0.2	

SALTS.

Sulphate of potass	6.25	20
Super-sulphate of potass	50	100+
Sulphate of soda	37.4	125
——— ——— ammonia	50	100
——— ——— magnesia	100	133
——— ——— alumina, very soluble, proportion unknown.		
Super-sulphate of alumina and potass } alum	5	133
——— ——— ——— ammonia		
Nitrate of baryta	8	25
——— potass	14.25	100+
——— soda	33	100

	Temperatures, 60°	212°
Nitrate of strontia	100	200
——— lime	400	any quantity.
——— ammonia	50	200
——— magnesia	100	100+
Muriate of baryta	20	
——— potass	33	
——— soda	35.42	36.16
——— strontia	150	any quantity.
——— lime	200	
——— ammonia	33	100
——— magnesia	100	
Oxy-muriate of potass	6	40
Phosphate of potass, very soluble.		
——— soda	25	50
——— ammonia	25	25+
——— magnesia	6.6	
Sub-borate of soda	8.4	16.8
Carbonate of potass	25	83.3
——— soda	50	100 +
——— magnesia	2	
——— ammonia	50+	100
Acetate of potass	100	
——— soda	35	
——— ammonia, very soluble.		
——— magnesia, do.		
——— strontia		40.8
Super-tartrate of potass	1.67	3.3
Tartrate of potass	25	
——— and soda	25	
Oxalate of potass	33	
——— ammonia	4.5	
Super-oxalate of potass		10
Citrate of potass, very soluble.		
Prussiate of potass and iron.		
Nitrate of silver, very soluble.		
Muriate of mercury (corrosive sublimate)	5	50
Sulphate of copper	25	50
Acetate of copper, very soluble.		
Sulphate of iron	50	133
Muriate of iron, very soluble.		
Tartrate of iron and potass.		
Acetate of mercury.		
Sulphate of zinc	44	44+
Acetate of zinc, very soluble.		
——— of lead (Ed. Pharm.) Bostock	27	
——— as it exists in Goulard's extract, more sol.		
Tartrate of antimony and potass, Duncan	6.6	33
Alkaline soaps, very soluble.		
Sugar	100	any quantity.
Gum, very soluble.		
Starch	0	very soluble.

	Temperatures, 60°	212°
Jelly	sparingly.	abundantly.
Gelatine	soluble.	more so.
Urea, very soluble.		
Cinchonin.		

Salts not soluble in 100 *times their Weight of Water.*

Sulphates of baryta, strontia, and lime, and sub-sulphate of mercury.
Phosphates of baryta, strontia, lime, magnesia, and mercury.
Fluate of lime.
Carbonates of baryta, strontia, and lime.
Muriates of lead and silver, and sub-muriate of mercury (Calomel).
Sub-acetate of copper.

Solubility of Saline and other Substances in 100 *Parts of Alcohol, at the Temperature of*......176°

All the acids, except the sulphuric, nitric, and oxy-muriatic, which decompose it, and the phosphoric and metallic acids.
Potass, soda, and ammonia, very soluble.
Red sulphate of iron.

Muriate of iron	100
——— lime	100
Nitrate of ammonia	89.2
Muriate of mercury	88.3
Camphor	75.
Nitrate of silver	41.7
Refined sugar	24.6
Muriate of ammonia	7.1
Arseniate of potass	3.75
Nitrate of potass	2.9
Arseniate of soda	1.7

Muriate of soda (Mr. Chenevix). Alkaline soaps. Magnesian do. Extractive. Tannin. Volatile oils. Adipocere. Resins. Urea. Cinchonin.

Substances insoluble in Alcohol.

Earths.
Phosphoric and metallic acids.
Almost all the sulphates and carbonates.
The nitrates of lead and mercury.
The muriates of lead, silver, and soda.
The sub-borate of soda.
The tartrate of soda and potass, and the super-tartrate of potass.
Fixed oils, wax, and starch.
Gum, caoutchouc, suber, lignin, gelatin, albumen, and fibrin.

Table of the Absorption of Gases by 100 Parts of Water at 60° F.

	Volume.	
Nitric acid	361000.	
Muriatic acid	51500.	Thomson
Ammonia	47500.	Davy
Sulphurous acid	12109.	Fourcroy
——	3300.	Thomson
——	1440.	Priestley
Carbonic acid	108.	Henry
Sulphuretted hydrogen	108.	Henry
Nitrous oxide	86.	Henry
Olefiant gas	12.5	Dalton
Nitric oxide	5.	Henry
Oxygen	3.7	Henry
Phosphuretted hydrogen	2.14	Henry
Carbonic oxide	2.01	Henry
Hydrogen	1.61	Henry
Nitrogen	1.53	Henry
Carburetted hydrogen	1.40	Henry

Table of Efflorescent Salts (Cadet de Vaux).

288 grains of	in days	lost grains
Sulphate of soda	61	203
Phosphate of soda	39	91
Carbonate of soda	51	86

Table of Deliquescent Salts (Cadet de Vaux).

288 grains of	in days	absorbed.
Acetate of potass	146	700
Muriate of lime	124	684
—— manganese	105	629
Nitrate of manganese	89	527
—— zinc	124	495
—— lime	147	448
Muriate of magnesia	139	441
Nitrate of copper	128	397
Muriate of antimony	124	388
—— alumina	149	342
Nitrate of alumina	147	300
Muriate of zinc	76	294
Nitrate of soda	137	257
—— magnesia	73	207
Acetate of alumina	104	202
Super-sulphate of alumina	121	202
Muriate of bismuth	114	174
Super-phosphate of lime	93	165
Muriate of copper	119	148

Carbonic acid is absorbed at mean temperatures by

Nitrate of baryta strontia lime	half volume, or 50
Nitric acid	
Alcohol	70

Which also absorbs the same quantity of sulph. hydrogen.

100 Grains of the following woods yielded,

	Of charcoal,	And of charcoal absorbed of water.
Fir	18.17	13
Lignumvitæ	17.25	9.6
Box	20.25	14.
Beech	15.	16.3
Oak	17.40	16 5
Mahogany	15.75	18.
Willow		12.5

Table of some Galvanic Circles, composed of two Perfect Conductors, and one Imperfect Conductor. (Davy.)

More oxygenizable substances	Less oxygenizable substances	Oxygenizing fluids.
Zinc	with gold, charcoal, silver, copper, tin, iron, mercury.	Solutions of nitric acid in water, of muriatic acid, sulphuric acid, &c. Water holding in solution oxygen, atmospheric air.
Iron	gold, charcoal, silver, copper, tin.	
Tin	gold, silver, charcoal.	
Lead	gold, silver.	
Copper	gold, silver.	Solution of nitrates of silver and mercury. Nitric acid, acetous acid.
Silver	gold.	Nitric acid.

Galvanic Circles, composed of two Imperfect Conductors, and one Perfect Conductor.

Perfect Conductors.	Imperfect Conductors.	Imperfect Conductors
Charcoal Copper Silver Lead Tin Iron Zinc	Solutions of hydroguretted alkaline sulphurets, capable of acting on the first three metals, but not on the last three.	Solutions of nitrous acid, oxygenized muriatic acid, &c. capable of acting on all the metals.

PLATE I.

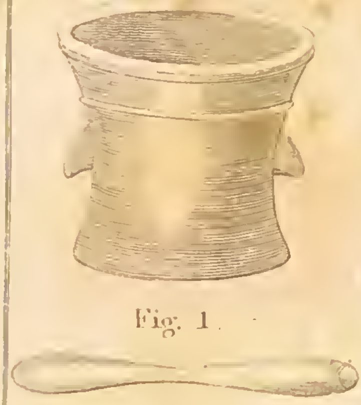
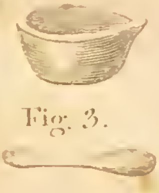


Fig. 1.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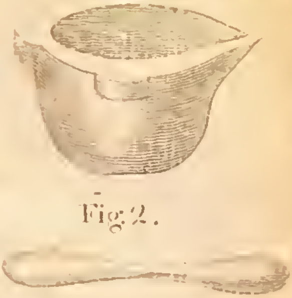
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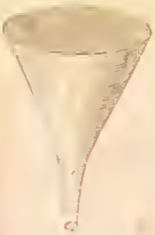
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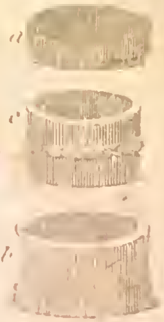

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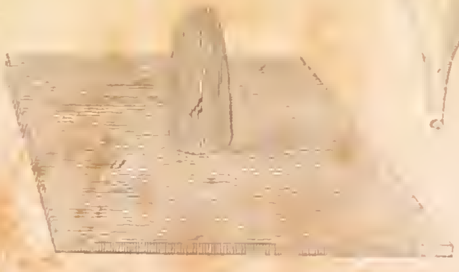
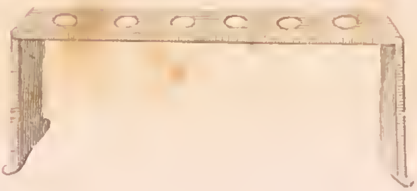


Fig. 4.

Fig. 7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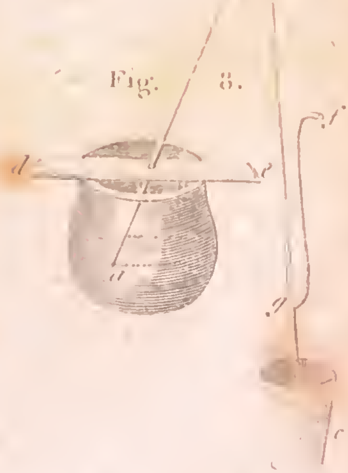

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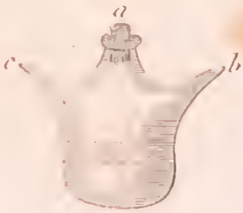

Fig. 10.

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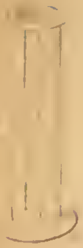
PLATE II.

Fig. 11.



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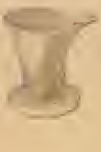

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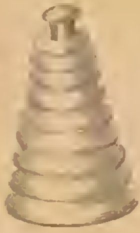


Fig. 14.

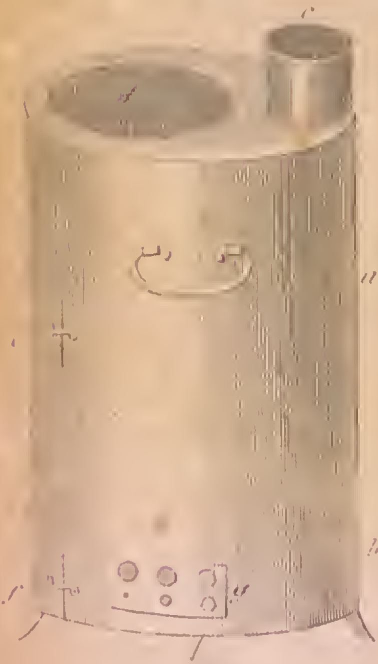


Fig. 15.

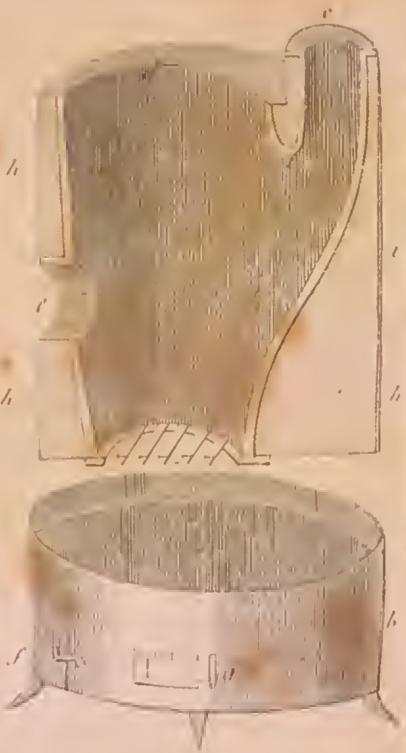
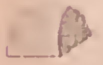


Fig. 16



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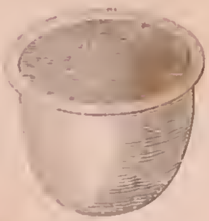


Fig. 18

Fig. 19.

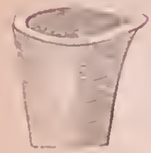


Fig. 20.

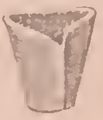
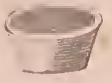


Fig. 21.



I. Lizars Sculp.

Electrical System of Bodies, by Ritter

−

INSULATORS.	CONDUCTORS.
Sulphur	Water
-	-
-	-
-	-
Sealing-wax	Oxide of manganese
-	-
-	-
-	-
Black silk	Graphite
-	-
-	-
-	-
White silk	Metallic sulphurets
-	-
-	-
-	-
Paper	Charcoal
-	-
-	-
-	-
Wood	Silver
-	-
-	-
-	-
Wool	Copper
-	-
-	-
-	-
Glass	Iron
-	-
-	-
-	-
Tourmalin	Lead
-	-
-	-
-	-
Diamond	Zinc

+

Pharmaceutical Calendar for the Climate of Weimar, by Goëttling, shewing the principal Objects which the Apothecary has to attend to in each Month of the Year.

JANUARY.—The concentration of vinegar by freezing,
Muriate of antimony,
Ethers,
Dulcified spirits,
Dippel's animal oil to be prepared;
Some gum resins, as assafœtida, galbanum, ammoniac, &c. to be powdered.
FEBRUARY—As in January.
MARCH—Mezereon bark,
Misletoe of the oak to be gathered;
Conserve of scurvy-grass to be prepared.
APRIL—Spirit of scurvy-grass,
Syrup of violets, to be prepared.
MAY—Sloe flower water,
Conserve of sorrel;
Plaster of henbane,
Extract of succory, henbane, grass, dandelion, &c.
Oil of beetles (Melöe majalis et proscarabæus),
Spirit of ants, earthworms, &c.
JUNE—Distilled water of lily of the valley,
Various distilled spirituous waters,
Conserves of various herbs and flowers, as conserve of roses, &c.
Hemlock plaster,
Extracts of hemlock, fumatory, wild lettuce, aconite, &c.
JULY—Vinegar of roses,
Rose water,
Marjoram butter,
Preserved cherries, walnuts, currants, &c.
Extract of elaterium,
Honey of roses,
Boiled oil of hypericum, &c.
Distilled oil of rosemary, mint, parsley, pennyroyal, wild thyme, &c.
Syrup of cherries, raspberries, &c.
Spirit of rosemary.
AUGUST—Cherry water,
Extract of blessed thistle, thorn apple, &c.
Boiled oil of wormwood, chamomile, &c.
Distilled oil of wormwood, chamomile, peppermint, millefoil, rue, &c.
Rob of mulberries,
Syrup of ditto.
SEPTEMBER—Quince cinnamon water,
Oxymel of meadow saffron,
Quince cakes,
Syrup of barberries, quince, buckthorn.
Tincture of steel, with quince juice.
OCTOBER—Tincture of steel, with apple juice.
NOVEMBER and DECEMBER—As in January.

PLATE III.

Fig. 22.

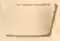
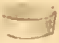


Fig. 23.



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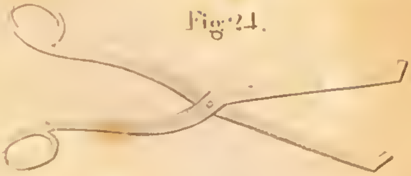

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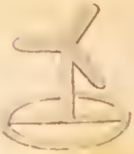


Fig. 26.

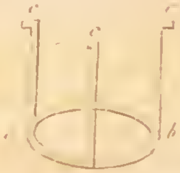


Fig. 27.

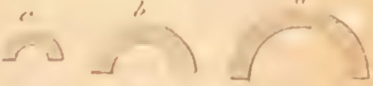


Fig. 28.

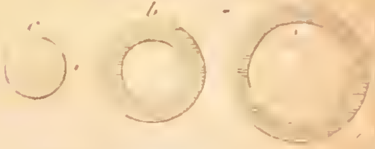


Fig. 29.

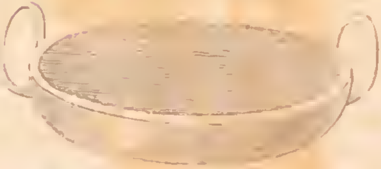


Fig. 30.

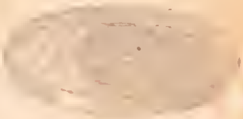


Fig. 31.

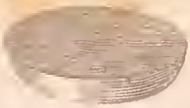


Fig. 32.

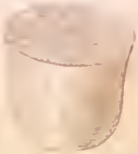


Fig. 33.

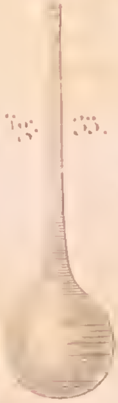


Fig. 34.

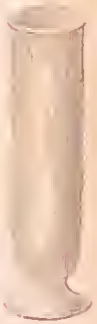


Fig. 35.

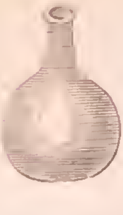


Fig. 36.

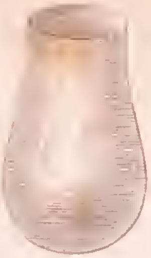
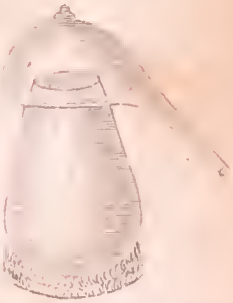


Fig. 37.



[illegible] Sculp.

g. 38.

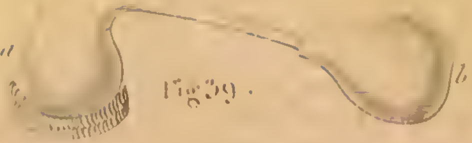


Fig 39.

Fig. 41.

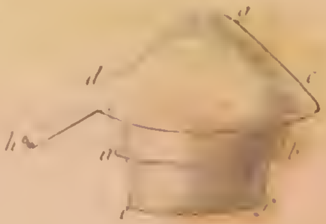


Fig 40.

Fig. 42.

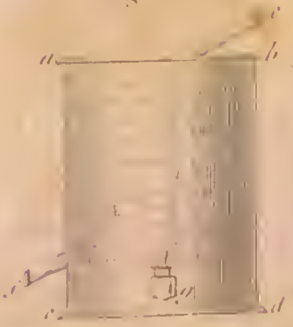


Fig 43.

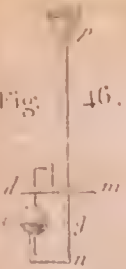


Fig. 46.

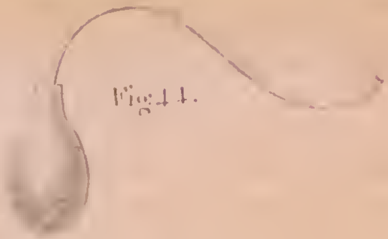
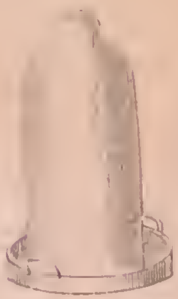


Fig 44.

Fig. 50.

Fig. 49.



EXPLANATION OF THE PLATES.

PLATE I.

Fig. 1, 2, 3, Mortars of metal. marble, and earthen ware, with their respective pestles.

Fig. 4, A levigating stone and muller.

a, The table of polished porphyry or other siliceous stone.
b, The muller of the same substance.

Fig. 5, A compound sieve.

a, The lid.
c, The body containing the sieve.
b, The receiver.

Fig. 6, A funnel.

Fig. 7, A hooked glass rod. Several of which may be hung round the edge of the funnel, to prevent the filtering substances from adhering too closely to its sides.

Fig. 8, A compound syphon.

a, *b*, *c*, The syphon.
f, *g*, The mouth-piece.
d, *e*, A board for supporting it.

When we insert the upper orifice *a* into any liquid, and close the lower orifice *c* with the finger; by sucking through *f*, the fluid rises from *a* to *b*, and proceeds by *g* towards *f*; as soon as it has passed *g*, the finger is to be removed, and the fluid immediately flows through *c*, and continues flowing as long as any remains above the orifice *a*. It is absolutely necessary that the point *g*, where the mouth-piece joins the syphon, be lower than *a*.

Fig. 9, A board perforated with holes for supporting funnels.

Fig. 10, A separatory. The fluids to be separated are introduced through the orifice A, which is then closed with a stopper. The one neck is then to be shut with the finger, and the phial is to be inclined to the other side. As soon as the fluids have separated by means of their specific gravity, the finger is to be removed, and the whole of the heavier fluid will run through the lower neck, before any of the lighter escapes.

PLATE II.

Fig. 11 and 12, Graduated glass measures. 11, A cylindrical one for large quantities—12, A conical one for small quantities.

Fig. 13, A phial of a particular shape for keeping laudanum.

Fig. 14, External view of Dr. Black's furnace.

a, The body.
b, The ash-pit.
c, The chimney.
d, The circular hole for receiving the sand-pot.
e, A door about the centre of the body, to be opened when the furnace is used as a reverberatory. In Dr. Black's original furnace, there is no aperture in the side, and, indeed, as its peculiar excellence consists in the power which it gives the operator of regulating the quantity of air admitted to the fuel, and by that means of regulating the intensity of the fire; every aperture is rather to be considered as an injury than as an improvement. At all times when these apertures are not employed, they must be accurately closed and luted up.

f, The door of the ash-pit.

g, The damping plate for regulating the admission of air, having six holes, fitted with stoppers, increasing in size in a geometrical proportion.

Fig. 15, A vertical section of the body of the same furnace, to shew the manner of luting, and the form and position of the grate.

a——*g*, As in the former figure, except the damping plate, which is here closed by a sliding door with a graduated scale.

h, The form which is given to the lute of clay and charcoal which is applied next to the iron.

i, The form given to the lute of sand and clay, with which the former is lined.

e, Is a semicircular aperture left unluted, to serve as a door when necessary. On other occasions, it is filled up with a semi-cylindrical piece of fire-brick, Fig. 16, accurately luted in.

k, The grate fastened on the outside of the body.

Fig. 16, A semi-cylindrical piece of fire-brick, for closing the door *e* of the furnace.

Fig. 17, The sand-pot, which is suspended in the aperture *d* of the furnace, by means of the projecting ring *a b*.

Fig. 18, A muffle, *a a* apertures in its sides for the admission of the heated air.

Fig. 19, A large black lead crucible.

Fig. 20, A small Hessian crucible.

Plate III.

Fig. 21, 22, Tests.

Fig. 23, A small support of clay, to raise the crucible above the grate.

Fig. 24, A pair of crucible tongs.

Fig. 25, A support for raising the muffle, as high as the door *e* of the furnace.

Fig. 26, A ring for suspending a retort within the furnace, when we wish to expose it to the immediate action of the fire. The ring itself, *a b*, is suspended within the aperture *d* of the furnace, by means of the three hooked branches, *c*, *c*, *c*.

Fig. 27, Semicircular rings of plate-iron, for applying round the neck of a retort when suspended within the furnace, in order to close as much as possible the aperture *d*, Fig. 1. The largest pair *a* are first made to rest upon the edge of the aperture *d*, the next pair *b*, upon them, and so until they come in contact with the neck of the retort. The whole are then to be covered with ashes or sand, to prevent the loss of heat, and the escape of vapours, from the burning fuel.

Fig. 28, Circular rings, *a b*, to be applied in the same manner when we wish to evaporate with the naked fire. We must always take care that the fluid rises higher than the portion of the evaporating vessel introduced within the aperture of the ring; *c*, a circular piece of iron, which, when applied with the rings *a b*, completely closes the aperture *d* of the furnace.

Fig. 29, 30, 31, 32, Evaporating vessels of different shapes.

Fig. 33, A long-necked matrass.

Fig. 34, A jar.

Fig. 35, A phial or receiver.

PLATE V.

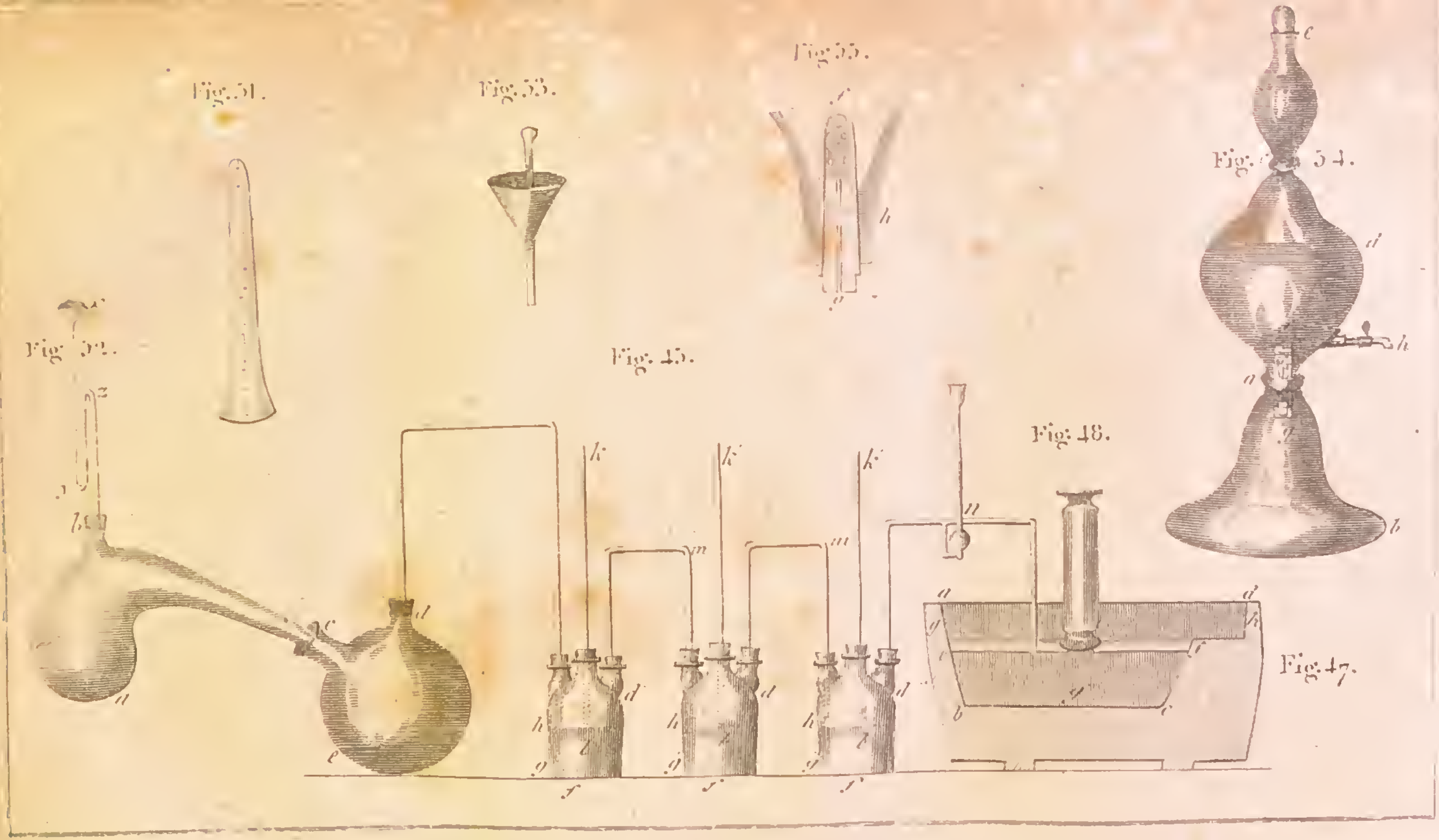


Fig. 51.
Fig. 53.
Fig. 55.
Fig. 54.
Fig. 52.
Fig. 45.
Fig. 48.
Fig. 47.
a
b
c
d
e
f
g
h
i
k
m
n
z

Fig. 36. A cucurbit.
Fig. 37, A cucurbit with its capital.

PLATE IV.

Fig. 38, The arrangement of the apparatus for distilling *per descensum*. The substance to be distilled is laid on the metallic plate *a*, which is perforated with holes. The burning fuel is laid upon the upper plate *b*, also of metal, but not perforated. On the application of heat, the vapour descends into the cavity *a*, *c*, where it is condensed.

Fig. 39, A retort and receiver; *a*, the retort; *b*, the receiver.

Fig. 40, A retort funnel.

Fig. 41, A metallic still.

c, *d*, *e*, *f*, The body.

a, *b*, *e*, *f*, The lower portion of the body, which hangs within the aperture *d* of the furnace, by the projecting part *a b*.

d, *g*, *c*, The head of the still.

d, *c*, A gutter which goes round the bottom of the head, for conveying any vapours which may be condensed there, into the spout *h*, which conveys away the vapour and the fluid condensed in the head into the refrigeratory.

Fig. 42, A refrigeratory.

a, *b*, *c*, *d*, A cylindrical vessel filled with cold water.

e, *f*, A spiral metallic pipe which passes through it. The spout *h* of the still is inserted within the upper orifice *e*; therefore the vapours which escape from the head of the still enter it, and are condensed in their passage towards *f*, the lower termination of the pipe from which the distilled fluid runs, and is received into proper vessels. As the water in the vessel *a*, *b*, *c*, *d*, continually abstracts caloric from the vapours, it is apt to become too warm to condense them. As soon, therefore, as any steam escapes by the spout *f*, the water must be drawn off by the cock *g*, and its place supplied by cold water.

Fig. 43, A vessel for boiling inflammable fluids.

a, *b*, *c*, *d*, The body of the kettle.

d, *e*, *f*, A long spout proceeding from it, for preventing any risk of boiling over.

g, A short spout for pouring out. The vessel should not be filled above *h*, *f*, and the long spout *d*, *e*, *f*, should be placed so as to be as little heated as possible. When the fluid begins to swell and boil up, both from the great increase of surface, and from part of it running up the cooler spout *d*, *e*, *f*, the ebullition will be checked, and all danger of running over prevented.

Fig. 44, A body with a bent tube.

a, *b*, The body.

b, *c*, A sigmoid tube accurately ground to it. When any permanently elastic fluid is generated within the body *a*, *b*, it escapes by the extremity of the tube, and may be collected by introducing it under a jar filled with water or mercury in the pneumatic cistern. This simple apparatus can only be used conveniently when the production of the gas is slow, or requires the application of heat.

Fig. 45, A Woulfe's apparatus.

a, *b*, *c*, *d*, *e*, A tubulated retort and receiver.

f, f,' f," Three three-necked bottles. The first, *f*, is commonly filled with water, and the two others with alkaline solutions.

d, g, d,' g,' d," g," d,"' g,"' Bent tubes connecting the different parts of the apparatus, so that when any vapour escapes from the receiver *c, d, e,* it passes along the tube *d, g,* and rises through the fluid contained in the bottle *f*, where it remains in contact with the surface, and under considerable pressure, until the expansion of the vapour, not condensable in *f*, overcomes the column of fluid *h, g,'* in the bottle *f,'* and escapes into the upper part of *f.'* In the same manner the uncondensed vapours proceed to *f,"* and at last to the pneumatic apparatus.

But, as in processes of this kind, diminution of temperature and other causes frequently produce sudden condensations of the gases contained in the different parts of the apparatus, especially in the retort and receiver, any such occurrence would cause the fluids to move through the connecting tubes in a retrograde direction. This accident is prevented, by inserting through the third neck of each bottle a small tube *k, l,* having its lower extremity *l* immersed in the fluid contained in the bottle. By this contrivance no fluid can possibly pass from one bottle into another, because the columns *g, m,* &c. which resist the absorption, are much higher than the columns *h, l,* which oppose the admission of external air; while, on the contrary, no gas can escape through these tubes, because the columns *h, k,* which oppose their escape, are higher than the columns *g, h,* which resist its progress to the next bottle. From their use, these tubes have got the name of tubes of safety.

Another contrivance for the same purpose, the invention of C. Welter, seems now to be much used in France. It is fixed to the connecting tubes, as at *n.*

Fig. 46, To explain it more fully, we have given a separate view, taken in an oblique direction When the apparatus is adjusted, a small quantity of water is poured through the funnel *p*, until it rises to about the centre of the ball *o*. Now, on any absorption taking place, the fluid rises in the ball *o*, until the column *g n* be annihilated, when a quantity of air will immediately rush in through *p g n o,* &c. and the water will regain its former equilibrium. On the other hand, no gas can escape by this tube, because the whole fluid contained in the ball and tube must previously enter the portion of the tube *n p*, where it would form a column of such a height that its pressure could not be overcome.

Fig. 47, A verticle section of a pneumatic cistern.

a b c d, The whole cavity of the cistern.

e f, A shelf for holding the jars.

e b c, The well for filling the jars.

g h, The surface of the fluid contained in the cistern, which must always be higher than the surface of the shelf.

Fig. 48, 49, 50, 51, Pneumatic jars of different shapes.

Fig. 48, A jar in the situation in which it is filled with gas.

Fig. 49, A jar fitted with a stop-cock.

Fig. 50, A jar placed upon a tray for removing it from the pneumatic cistern.

PLATE V.

Fig. 51, A graduated jar, commonly called an Eudiometer.

Fig. 52, A hydrostatic funnel, for pouring fluids gradually into air-tight vessels, especially when attended with the formation of gas. It is evident, that any portion of fluid, poured into the funnel *x*, more than sufficient to fill the two first parts of the bent tube up to the level *z*, will escape by the lower extremity *b*. At the same time, no gas can return through this funnel, unless its pressure be able to overcome the resistance of a column of fluid of the height of *x y*.

Fig. 53, Another contrivance for the same purpose. It consists of a common funnel, in the throat of which is inserted a rod with a conical point, which regulates the passage of the fluid through the funnel, according to the firmness with which it is screwed in.

Fig. 54, Nooth's apparatus for promoting the absorption of gaseous fluids by liquids. It consists of three principal pieces; a lower piece *a b*, a middle piece *a c*, and an upper piece *d c e*; all of which are accurately ground to each other. The substances from which the gas is to be extricated are put into the lower piece. The middle piece is filled with the fluid with which the gas is to be combined, and the upper piece is left empty. As soon as a sufficient quantity of gas is formed to overcome the pressure, it passes through the valve *f*, *g*, and rises through the fluid to the upper part of the middle piece. At the same time it forces a quantity of fluid into the upper piece through its lower aperture *d*. As soon as so much of the fluid has been forced from the middle piece as to bring its surface down to the level of the lower aperture of the upper piece, a portion of gas escapes into the upper piece, and the fluid rises a little in the middle piece. The upper piece is closed with a conical stopper *e*, which yields, and permits the escape of a portion of gas, as soon as its pressure in the upper piece becomes considerable. *h* Is a glass cock for drawing off the fluid.

Fig. 55, The valve of Nooth's apparatus. It consists of an internal tube *g*, of small caliber, but pretty stout in substance, and ground into an external tube *f*, closed at the upper end, but perforated with small holes, to allow the gas to pass. After the internal tube is fitted to the external, a portion of it is cut out, as at *h*, sufficient to receive a small hemisphere of glass and to allow the hemisphere to rise a little in its chamber, but not to turn over in it. The upper piece of the internal tube is then thrust home into the place where it is to remain, and the glass hemisphere introduced with its plane recumbent on the upper end of the lower piece of the tube, which is ground perfectly flat, as is also the plane of the hemisphere. From this construction it is evident, that by the upward pressure of any gas, the glass hemisphere may be raised so as to allow it to pass, while nothing can pass downwards, for the stronger the pressure from above, the closer does the valve become. We have been more particular in our description of this valve, because it has been very ingeniously applied to distilling apparatuses by Mr. Pepys *junior* and Mr. Burkit.

CHEMICAL SIGNS.

It is unnecessary here to point out the advantages which might result from a well-contrived system of chemical signs. About the same ime that the French chemists introduced their methodical nomenclature, they also proposed a corresponding system of chemical signs, which they intended should speak a language to be understood by the learned of all nations. In our explanation of their system, we shall nearly follow what Mr. Chenevix has said in his judicious remarks upon chemical nomenclature.

There are six simple radical signs, which may be considered as so many genera.

The first genus is the zig-zag line, and is used to denote light. See Plate VI, No. 1.

The second genus is the straight line. It comprehends three species, characterized by its direction.

Sp. 1, A perpendicular line denotes caloric, 3.

Sp. 2, A horizontal line, oxygen, 2.

Sp. 3, An oblique line from right to left, nitrogen, 4.

The third genus is a crescent, which is the generic sign of simple combustibles.

Sp. 1, With the horns inclined to the right, carbon, 5.

Sp. 2, The reverse of the former, hydrogen, 6.

Sp. 3, With the points upwards, sulphur, 7.

Sp. 4, The reverse of the latter, phosphorus, 8.

The fourth genus is a triangle. It comprehends the simple salifiable bases.

Sp. 1, With the point upwards, and the base horizontal, 9, the alkalies.

Sp. 2, With the point downwards, 10, the earths.

Each of the species of this genus comprehends several individuals, which are distinguished by inserting within the triangle the first letter of its name in the Latin language; or if two species begin with the same letter, the first letter of the second syllable is added: thus; for potass, P; soda, S; baryta, B; strontia, St; lime, C; magnesia, M; glucina, Gc; gadolina, Gd; or Y, for Yttria; alumina, Al; zirconia, Z; silica, Si.

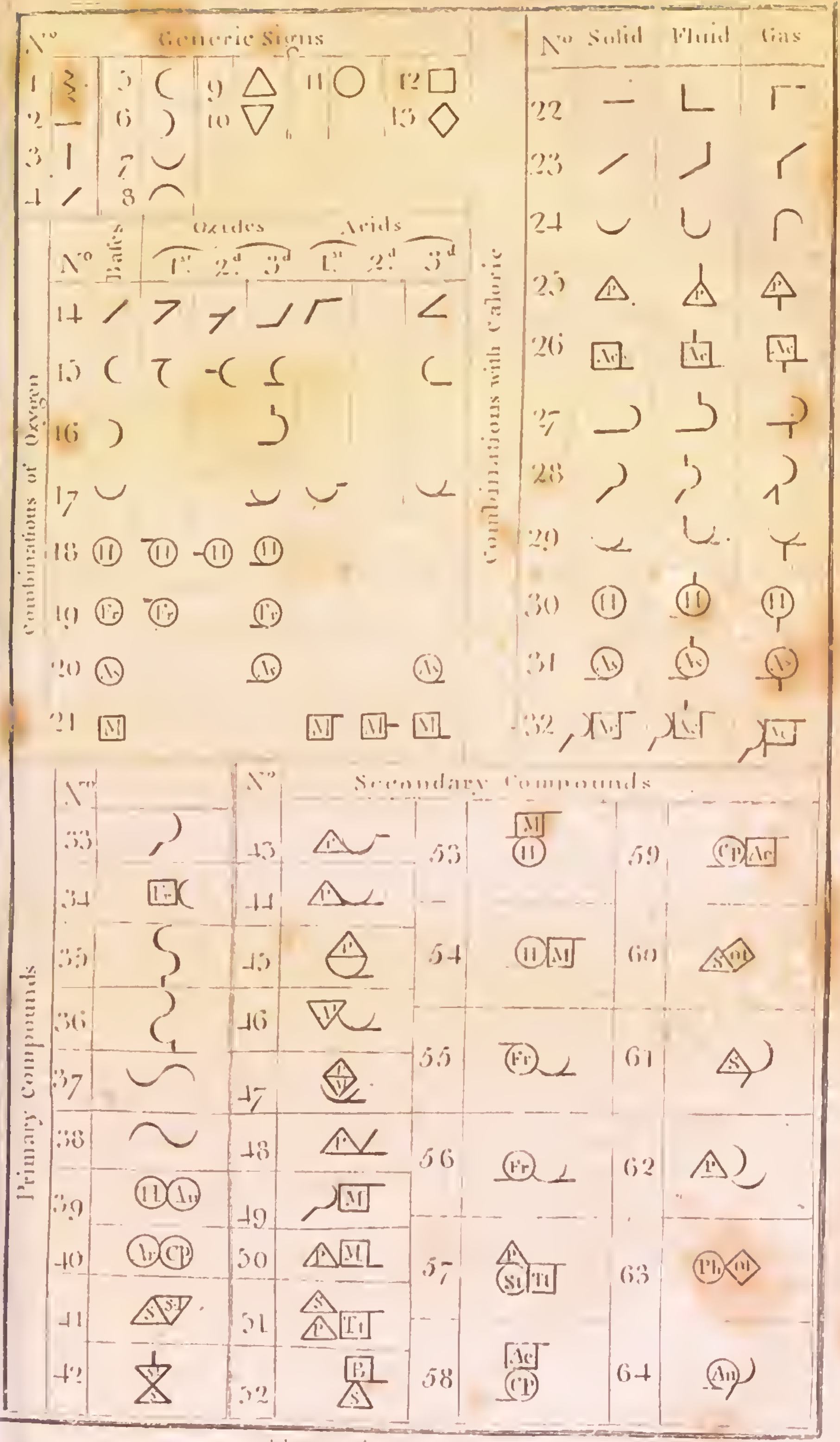
The fifth genus is a circle, 11. It comprehends the metals; and the species are distinguished in the same manner as the former, by inserting within it the primary letters of the first and second syllables: thus; for gold, Ar; platinum, Pt; silver, Ag; mercury, H; copper, Cp, iron, Fr; lead, Pb; tin, Sn; zinc, Z; antimony, Sb, or At; bismuth, B; cobalt, Cb; nickel, Nk; manganese, Mg; uranium, U; titanium, Tt; tellurium, Tl; chromium, Cm; arsenic, As; molybdenum, Ml; tungsten, Ts; columbium, Cl

The sixth genus is a square. It comprehends all the unknown bases of the acids, and the bases of the compound oxides and acids

Sp. 1, A square with perpendicular sides, 12. It contains the unknown and compound acidifiable bases.

Sp. 2, A square with inclined sides, 13. It contains the compound oxides. The individuals of both species are distinguished as before.

All compound bodies are expressed by combinations of these simple characters. But as simple bodies are capable of uniting in various proportions, it becomes necessary that these proportions should be expressed; and relative position has appeared the most natural method of doing so. In general, when the proportion of any body in a compound is small, its sign is placed above, when large below, as in 35, 36, 42, &c.


N°
Generic Signs
1
2
3
4
5
6
7
8
9
10
11
12
13
Combinations of Oxygen
N°
Bases
Oxides
1st
2d
3d
Acids
1st
2d
3d
14
15
16
17
18
H
19
Fr
20
Az
21
M
Combinations with Caloric
N°
Solid
Fluid
Gas
22
23
24
25
P
26
Ac
27
28
29
30
H
31
Az
32
Ac
Primary Compounds
N°
33
34
Fr
35
36
37
38
39
H
Az
40
Az
CP
41
S
Su
42
S
N°
Secondary Compounds
43
P
44
P
45
P
46
P
47
P
48
P
49
M
50
P
M
51
S
P
Ti
52
B
S
53
M
H
54
H
M
55
Fr
56
Fr
57
P
Si
Ti
58
Ac
CP
59
CP
Ac
60
S
Ol
61
S
62
P
63
Pb
Ol
64
An

Caloric exists in all bodies: but according to its relative quantity, they exist as solids. fluids, or gases. To express the first state, it has not been thought necessary to introduce the sign of caloric; to express the second, it is placed above; and to express the third, below, as in the examples in the plate (22—32).

Oxygen also combines with many bodies, and in several proportions. The products resulting from these combinations are either oxides or acids. The oxides may be characterized by affixing the sign of oxygen to the left side of the sign of the base, and the acids by affixing it to the right; and the greater or less degree of each may be marked by placing it above or below, as in the examples in the plate. In this I have deviated from all the tables of chemical signs which I have seen, and, I trust, with propriety; for M. Chenevix has remarked of the system, that ‘ one of its chief defects is, the impossibility of marking, ‘ by any principles it points out, the difference of the metallic oxides. ‘ A circle, with the mark of oxygen at the top, is the only method ‘ of marking a metallic oxide; for if we put the mark of oxygen lower, it will then have the force of an acid, and we must not confound ‘ the situation of the signs to mark differences of states, or the whole ‘ system will become confused.’ But the alteration proposed enables us to mark no less than six states of oxygenizement. When the sign of oxygen is placed on the left, it implies that the compound is an oxide; if it be placed at top, it expresses the smallest degree of oxidizement; at bottom the highest; and we have room for an intermediate one. The degrees of acidification are expressed in the same manner, except that the character of oxygen is placed to the right of the base. See 14—21. I have since found that the same proposal has been made by Dr. Vaudier, in the Journ. de Physique. vol. 56; and this coincidence is a proof that it is not arbitrary, but arises naturally from an attentive consideration of the subject.

The other primary combinations are expressed in the same way. When they unite only in one proportion, or when the proportions are indifferent, the signs are placed indifferently, though it would be better to place them in one determinate way; but when either of them is in excess, its sign is always placed below. Thus heavy hydro-carbonous oxide is expressed by placing the sign of hydrogen above that of carbon, 30; light hydro-carbonous oxide, by reversing their position, 35. Glass is expressed by placing the signs of soda and silica side by side, 41; the liquor silicum, by placing the sign of the alkali under that of the earth, and adding the sign of fluidity above, 42.

The secondary compounds are expressed in a similar manner. The basis has been generally placed before the acid, to admit of the sign of the degree of acidification being added to the acid; and the same position fortunately admits of the sign of the degree of oxidizement being added to the oxide, when a metallic oxide forms the basis of the salt. The excess of acid or base is marked as before, by placing the acid or base below. With regard to the metallic salts, Mr. Chevenix has given some reasons for not introducing the sign of oxygen; but he himself has given the most powerful reason for introducing it, by proving that the real difference between calomel and corrosive sublimate is in the state of oxidizement of the metal. The manner of marking the oxides proposed above, enables us to express this difference distinctly, when the degree of oxidizement is ascertained.

EXPLANATION OF THE TABLE OF CHEMICAL SIGNS.

Generic Signs.

No.

1. Light.	5. Carbon.	9. Alkalies.	11. Metals.	12. Acidifiable bases, unknown or compound.
2. Oxygen.	6. Hydrogen.	10. Earths.		
3. Caloric.	7. Sulphur.			13. Compound oxides.
4. Nitrogen.	8. Phosphorus.			

Combinations of Oxygen.

No.		Oxides.			Acids.		
		1.	2.	3.	1.	2.	3.
14.	Nitrogen.	Atmospheric air.	Nitrous oxide.	Nitric oxide.	Nitrous.		Nitric.
15.	Carbon.	Incombustible coal.	Charcoal.	Carbonic oxide.			Carbonic.
16.	Hydrogen			Water.			
17.	Sulphur.			Oxide of sulphur.	Sulphurous.		Sulphuric.
18.	Mercury.	Black oxide.	Yellow.	Red.			
19.	Iron.	Green oxide.		Red.			
20.	Arsenic.			White.			Arsenic.
21.	Muriatic radical.				Muriatic.	Oxygenized muriatic.	Hyper-oxygenized muriatic.

Combinations of Caloric.

22. Oxygen. 23. Nitrogen. 24. Sulphur. 25. Potass. 26. Acetic acid. 27. Ice. 28. Ammonia. 29. Sulphuric acid. 30. Mercury. 31. White oxide of arsenic. 39. Acetate of ammonia. The three columns represent the mode of characterizing the three states of aggregation of each of these substances.

Primary Compounds.

33. Ammonia. 34. Carburet of iron. 35. Light hydro-carbonous oxide. 36. Heavy hydro-carbonous oxide. 37. Sulphuretted phosphorus. 38. Phosphuretted sulphur. 38. Amalgam of gold. 40. Alloy of silver and copper. 41. Glass. 42. Silicized Potass.

Secondary Compounds.

43. Sulphite of potass. 44. Sulphate of potass. 45. Super-sulphate of potass. 46. Sulphate of alumina. 47. Super-sulphate of alumina and potass, alum. 48. Nitrate of potass. 49. Muriate of ammonia. 50. Hyper-oxygenized muriate of potass. 51. Tartrate of soda and potass. 52. Sub-borate of soda. 53. Submuriate of mercury less oxidized, calomel. 54. Muriate of mercury more oxidized, corrosive sublimate. 55. Green sulphate of iron. 56 Brown Sulphate of iron. 57. Tartrate of antimony and potass 58. Sub-acetate of copper. 59. Acetate of copper. 60. Soap of soda. 61 Soap of ammonia. 62. Hydroguretted sulphuret of potass. 63. Litharge plaster. 64. Ammoniuret of gold. Fulminating gold,

PART II.

MATERIA MEDICA.

EVERY substance employed in the cure of disease, whether in its natural state, or after having undergone various preparations, belongs to the Materia Medica, in the extended acceptation of the words. But in most Pharmacopœias, the materia medica is confined to simples, and to those preparations which are not supposed to be prepared by the apothecary himself, but to be purchased by him, as articles of commerce, from druggists and others.

Systematic authors on this branch of medical knowledge have bestowed much pains in contriving scientific arrangements of these articles. Some have classed them according to their natural resemblances; others according to their active constituent principles; and others according to their real or supposed virtues. Each of these arrangements has its particular advantages. The first will probably be preferred by the natural historian, the second by the chemist, and the last by the physiologist. But every scientific classification hitherto proposed is liable to numerous objections. Accordingly, in the Pharmacopœias published by the colleges of physicians of London, Dublin, and Edinburgh, the articles of the materia medica are arranged in alphabetical order; and the same plan is now almost universally adopted. I have therefore also followed it, subjoining to the name of each article, admitted by any of the British colleges, a short view of its natural, medical, and pharmaceutical history; and in thus forming a dictionary of materia medica, I have generally adopted the nomenclature of the Edinburgh college.

In an appendix, I have given a very concise account of such other substances as, from their possessing a place in some respectable foreign Pharmacopœias, or from their active properties, seemed to deserve notice. And to conjoin with the history of the materia medica in alphabetical order the advantages of other methods, I have added some of those arrangements which seem most useful.

ACIDUM ACETOSUM. *Ed.*

ACETUM VINI. *Dub.*

ACETUM. *Lond.*

Vinegar. Impure acetous acid.

VINEGAR, as obtained by the fermentation of vinous liquors, besides the pure acetic acid diluted with much water, contains tartaric acid, tartrate of potass, mucilaginous matters, and sometimes phosphoric acid. The least impure is that prepared from white wine. Vinegar should be of a pale yellow colour, perfectly transparent, of a pleasant, somewhat pungent, acid taste, but without any acrimony. From the mucilaginous impurities which vinegar always contains, it is apt, on exposure to the air, to become turbid and ropy, and at last vapid. This inconvenience is best obviated by keeping it in bottles completely filled and well corked; and it is said to be of advantage to boil it in the bottles a few minutes before they are corked.

Vinegar is sometimes adulterated with sulphuric acid. Its presence is detected, if, on the addition of a solution of nitrate of baryta, a white precipitate is formed, which is insoluble in nitric acid, after having been burnt in the fire. With the same intention, of making the vinegar appear stronger, different acrid vegetables are occasionally infused in it. This fraud is difficult of detection; but when tasted with attention, the pungency of such vinegar will be found to depend rather on acrimony than acidity.

Vinegar possesses strong antiseptic powers on dead animal and vegetable matters. Hence its employment in pickling. The fine green colour, so much admired in some vegetable pickles, is often improperly given by means of copper. This poisonous addition is easily detected, on dropping some carbonate of ammonia into the suspected vinegar, by the fine blue colour produced.

Medical uses.—Its action on the living body is gently stimulant and astringent. It promotes transpiration and the discharge by urine; and used moderately as a condiment, it facilitates digestion.

Vinegar is employed as a useful addition to drink in inflammatory fevers, in the proportion of about an ounce to a quart. Internally, it is used in putrid diseases, in plague, in scurvy, and to counteract the effects of narcotic poisons and mephitic vapours. In the form of clyster, it is used in the same diseases, and in obstinate constipation. Externally, it is applied in fomentations and baths, as a stimulant and discutient; and its vapour is inhaled in putrid sore throat, and diffused through the chambers of the sick, to correct the putrescency of the atmosphere.

Officinal preparations.

Acidum acetosum aromaticum. *E.*
——————— camphoratum. *E. D.*
——————— destillatum. *L. E. D.*
——————— forte. *L. E. D.*
Acetum scillæ. *L. D.*
Cataplasma sinapeos. *L. D.*
Ceratum saponis. *L.*
Mel acetatum. *L. D.*
Oxymel æruginis. *L.*
——— colchici. *L.*
——— scillæ. *L.*
Syrupus acidi acetosi. *E.*
———— colchici autumnalis. *E.*

ACIDUM SULPHURICUM. *Ed.*

ACIDUM SULPHURICUM. *D.*
ACIDUM VITRIOLICUM. *L.*
Sulphuric acid, Vitriolic acid.

THE London and Edinburgh colleges direct, that in the shops its specific gravity should be to that of water as 1850 to 1000; the Dublin college as 1845 to 1000. This want of uniformity is to be regretted.

The physical and chemical properties of this acid have been already enumerated. As it is prepared by the trading chemist, it is inserted among the materia medica. It is obtained in two ways; by distilling off the acid from sulphate of iron, previously deprived of its water of crystallization by heat, or by burning sulphur in large leaden chambers, with an eighth part of nitrate of potass to supply the necessary oxygen. In the first way the strongest acid is obtained, but it is apt to contain iron or copper. By the second process it generally contains lead, which is easily detected by mixing a portion of the acid with three parts of distilled water, and if the acid be impure, a deposition will be formed. It may be rendered perfectly pure by distillation, filling a retort half full of the common acid, and distilling in a sand-bath, gradually heated as long as any acid comes over. The receiver should not be luted on.

Sulphuric acid acts powerfully on dead animal substances, becoming diluted with water formed by the union of part of their hydrogen and oxygen; another portion of the hydrogen combines with the azote to form ammonia, and the carbon is separated in the state of charcoal. The affinities which regulate this action are so powerful, that it produces the same effects on the living solid, and therefore it acts upon them as a corrosive. But its employment with this view, its fluidity is an objection, as cannot be easily managed.

Medical uses.—These will be explained when we treat of the diluted sulphuric acid. The concentrated acid, however, made into an ointment with sixteen times its weight of axunge, has been used in the cure of psora.

Officinal preparations.

Acidum sulphuricum dilutum. *E. L. D.*
Acidum sulphuricum aromaticum. *E.*

It is also used in the preparation of

Acidum nitrosum. *E. L. D.*
Acidum muriaticum. *E. L. D.*
Aqua supercarbonatis potassæ. *E.*
Sulphas potassæ. *E.*
Phosphas sodæ. *E.*
Murias antimonii. *E. L.*
Sulphas ferri. *E. L. D.*
Murias hydrargyri. *E. L. D.*
Sub-sulphas hydrargyri flavus. *E. L.*
Æther sulphuricus. *E. L. D.*

ACIDUM CITRICUM CRYSTALLIS CONCRETUM. *Dub.*

Citric acid crystallized.

The simple expressed juice of lemons is extremely apt to spoil, on account of the sugar, extractive, mucilage, and water, which cause it to ferment.

Various means have been proposed and practised, with the intention of rendering it less perishable, and less bulky. The juice has been evaporated to the consistence of rob; but this always gives an empyreumatic taste, and does not separate the extractive or mucilage, so that it is still apt to ferment when agitated on board of ship in tropical climates. It has been exposed to frost, and part of the water removed under the form of ice; but this is liable to all the former objections, and besides, where the lemons are produced in sufficient quantity, there is not a sufficient degree of cold. The addition of a quantity of alcohol to the inspissated juice separates the mucilage, but not the extractive or sugar. By means, however, of Scheele's process, as reduced to determinate quantities by Proust, we can obtain the acid perfectly pure and crystalized.

To 94 parts of lemon juice, 4 parts of carbonate of lime are to be added; the carbonic acid is separated by effervescence, and a quantity of insoluble citrate of lime is precipitated. By evaporating the supernatant liquor, another portion of citrate of lime is obtained. These added together amount to about $7\frac{1}{2}$ parts, and require 20 parts of sulphuric acid, of the specific gravity of 1.15, to decompose them. The sulphate of lime, being nearly insoluble, is precipitated, while the citric acid remains in solution, and is to be separated by washing, and crystallized by evaporation. If too much sulphuric acid be added, when the liquor is much concentrated, the citric acid is re-acted upon, and part of it is charred. In this case a little chalk must be added, to saturate the excess of sulphuric acid.

By this, or some similar process, it is now manufactured in this country, in large quantities, and sold under the name of Coxwell's Concrete Salt of Lemons.

ACIPENSER. *Pisces Branchiostegi,* Cuvier.
Sp. Acipenser Huso. *Lond. Dub.*
The Beluga, or Isinglas fish.
Sp. Acipenser Ruthenus. *Lond. Dub.*
The Sterlet, or caviar sturgeon.

Officinal—Ichthyocolla. *Lond. Dub.* Isinglas.

Besides those mentioned by the London college, isinglas is prepared from other species of Acipenser, especially *A. sturio,* the sturgeon, and *A. stellatus,* the serruga.

The preparation of isinglas is almost peculiar to Russia. It is made in all places where the large species of sturgeon are caught, as on the Dneiper, the Don, and especially on the Caspian sea, also on the Volga, the Ural, the Oby, and the Irtysh. That prepared from the sturgeon is reckoned the best, and next to it, that from the beluga. It also varies according to the mode of preparation. On the Volga and Ural, the sounds are watered while fresh, and dried to a certain degree. The outer skin is next taken off, and the inner glossy white membrane is twisted, nd then completely dried. The best is usually rolled into the orm of a snake or heart; the second folded in leaves, like a ook; and the worst is dried without any care. In other laces, as at Gurief, fish-glue is extracted from the sounds by oiling. This is cut into slabs or plates, is perfectly transparent, and has the colour of amber. On the Okka, where the erlet only is to be had, the sounds are beat just as they are extracted from the fish, and dried into glue.

Good isinglas is white, in some degree transparent, dry, composed of membranes, not too thick, and without any smell.

The properties of isinglas depend entirely on the gelatin, of hich it principally consists. One hundred grains of good isinas were found by Mr. Hatchett to contain rather more than nety-eight of matter soluble in water. A nutritious jelly may prepared from it. A watery solution of it is used as a test the presence of tannin, and for the clarification of spiritous quors. Mr. Davy's solution for the former purpose consists of 20 grains of isinglas dissolved in twenty ounces of water; and properly made, it has a tendency to gelatinise, at temperatures low 50° F.

It is said to be employed for the preparation of English court-plaster.

ACONITUM NEOMONTANUM. *Dub.*

Linnæi species plantarum, edit. Wildenow, genus 1062, *species* 9. *Polyandria Trigynia.*—Nat. ord. *Multisiliquæ.*

Aconitum. Lond. Aconitum Napellus. Ed.

Large Blue Wolfsbane, Monk's-hood, Aconite.

Officinal—Herba. *Lond.* Folia. *Ed. Dub.* The leaves.

THIS, we are assured by Wildenow, is the species of aconite which has always been used in medicine; although it is almost universally known by the name of Aconitum Napellus, in consequence of a botanical error of Stoerk, who introduced it into practice.

It is a perennial plant, found in the Alpine forests of Carinthia, Carniola, and other mountainous countries in Germany, and cultivated in our gardens.

The fresh plant and root are very violent poisons, producing remarkable debility, paralysis of the limbs, convulsive motions of the face, bilious vomiting, and catharsis, vertigo, delirium, asphyxia, death. The fresh leaves have very little smell, but when chewed, have an acrid taste, and excite lancinating pains, and swelling of the tongue. By drying, its acrimony is almost entirely destroyed. For medical use, the plant must be gathered before the stem shoots.

Uses and dose.—When properly administered, it acts as a penetrating stimulus, and generally excites sweat, and sometimes an increased discharge of urine.

On many occasions, it has been found a very effectual remedy in glandular swellings, venereal nodes, anchylosis, spina ventosa, itch, amaurosis, gouty and rheumatic pains, intermittent fevers, and convulsive disorders.

We may begin by giving one or two grains of the dried leaves in powder; but it is commonly used in the form of an inspissated juice. As soon as the plant is gathered, the juice is expressed, and evaporated without any previous clarification, to the consistence of an extract. It is to be regretted that the powers of this medicine vary very much, according to its age, and the heat employed in its preparation. When recently prepared, its action is often too violent; and when kept more than a year, it becomes totally inert. It may therefore be laid down as an universal rule, in the employment of this and of many other similar active medicines, to begin with very small doses, and to increase them gradually to the necessary degree; and whenever we have occasion to begin a new parcel of the medicine, we should again commence with the smallest dose, and proceed with the same caution as at first.

We may begin with giving half a grain of this extract, either formed into a powder with ten grains of white sugar, or made up with any convenient addition into a pill, twice or thrice a-day, and gradually increase the dose: or a tincture of aconite may be prepared, by digesting one part of the dried leaves in six parts of spirit of wine; the dose of which will be at first five or ten drops, and may be gradually increased to forty.

Off. prep.—Succus spissatus aconiti napelli. *Ed.*

ACORUS CALAMUS. *Ed.*

Willd. g. 663. *sp.* 1.—*Smith. Flor. Brit. g.* 179. *sp.* 1.—*Hexandria Monogynia.*—Nat. Ord. *Piperitæ.*

Calamus aromaticus. Lond. Acorus. Dub.

Sweet flag.

Officinal—Radix. The root.

THIS plant is perennial, and grows plentifully in rivulets and marshy places about Norwich, and other parts of England, in the canals of Holland, in Switzerland, and in other countries of Europe. The shops have been usually supplied from the Levant with dried roots, which do not appear to be superior to those of our own growth.

The root is full of joints, crooked, somewhat flatted on the sides, internally of a white colour, and loose spongy texture; its smell is strong; the taste warm, acrid, bitterish, and aromatic; both the smell and taste are improved by exsiccation. This root is generally looked upon as a carminative and stomachic medicine, and as such is sometimes made use of in practice. It is said by some, though erroneously, to be superior in aromatic flavour to any other vegetable that is produced in these northern climes. It is, nevertheless, a sufficiently elegant aromatic. The fresh root candied is said to be employed at Constantinople as a preservative against epidemic diseases. The leaves of this plant have a sweet fragrant smell, more agreeable, though weaker, than that of the roots.

Neumann obtained by distillation about two scruples of fragrant volatile oil from sixteen ounces of the dried root. It also rose in distillation with water, but not with alcohol. The spiritous extract from two ounces weighed 370 grains, and water extracted from the residuum, 190 grains. The watery extract from two ounces weighed 455 grains, and the residuum gave out to alcohol 43.

ÆSCULUS HIPPOCASTANUM. *Ed. Dub.*

Wild. g. 717. *sp.* 1.—*Heptandria Monogynia.*—Nat. ord. *Trihilatæ.*

Hippocastanum.

Horse chesnut.

Officinal—Semen. *Ed.* The seed.

THIS is a very common and well known tree. The fruit, which contains much amylaceous matter, has been used as food for domestic animals, and even for men, in times of scarcity. But its introduction into the Edinburgh Pharmacopœia was probably owing to its having been used and recommended as a sternutatory in some cases of ophthalmia and headach. With this view it was drawn up the nostrils, in the form of an infusion or decoction.

Officinal—Cortex. *Dub.* The bark.

The bark has been proposed as an indigenous substitute for the very expensive and often adulterated Peruvian bark. Many successful experiments of its effects, when given internally in intermittent and typhous fever, and also when applied externally in gangrene, sufficiently warrant future trials. Although chemical analysis is not yet sufficiently advanced, to enable us to determine from it the medical use of any substance, I may observe, that the active constituent of this bark is tannin, which is scarcely compatible with the presence of cinchonin, the predominant, and probably the active, constituent of Peruvian bark. In powder, it may be given to the extent of a scruple and a half, or a drachm, for a dose. Buchholz prefers a solution of a drachm of the extract in an ounce of cinnamon water, of which sixty drops are to be given every three hours.

AGRIMONIA EUPATORIA. *Dub.*

Wild. g. 951, *sp.* 1.—*Smith. Flor. Brit. g.* 224, *sp.* 1.—*Dodecandria Digynia.*

Agrimony.

Officinal—Herba. The herb.

THE herb, when fresh, has a pleasant smell, which, however, it loses on being dried. Its taste is then bitterish and astringent. Lewis got from it an essential oil of a yellow colour.

ALCOHOL. *Ed. Spiritus vinosus rectificatus. Lond. Dub.*

Alcohol, rectified spirit of wine.

THE spirit distilled from wine, or other fermented liquors, entirely free from any unpleasant smell, and of which the specific gravity is to that of water as 835 to 1000, such as may be easily procured. *(Ed.)* The London college order a spirit of the same specific gravity, and add, that it contains 95 parts of pure alcohol, and five of water. The Dublin college order it of the specific gravity 840.

Alcohol is the characteristic principle of vinous liquors. It arises from the decomposition of sugar by fermentation, and is found in greatest quantity in the wines of warm countries, and in wines prepared from thoroughly ripened fruit. In the south of France, wines yield a third of brandy. It is the proportion of alcohol which renders wines more or less generous, and prevents them from becoming sour. The richer a wine is in alcohol, the less malic acid it contains; and therefore the best wines give the best brandy, because they are free from the disagreeable taste which the malic acid imparts to them. Old wines give better brandy than new wines, but less of it.

Alcohol is produced from wine by distillation; in conducting which, the following rules are to be observed:

1. To heat the whole mass of fluid at once, and equally.
2. To remove all obstacles to the ascent of the vapour.
3. To condense the vapour as quickly as possible.

The distillation is continued until the liquor which comes over is not inflammable.

Baumé mentions a very remarkable fact concerning the preparation of alcohol. He distilled two pounds of alcohol, specific gravity 832, in the water bath, and filled the refrigeratory with ice, and he obtained two pounds four ounces of an alcohol having only specific gravity 862. This he ascribes to water condensed from the air in the worm by the coldness of the ice; and he assures us, from experience, that to get an alcohol of 827, it is absolutely necessary that the refrigeratory be filled with water of 145° F.

Distillers judge of the strength of spirits by the size and durability of the bubbles they form, when poured from one vessel into another, or on agitating them in a vessel partly filled. Another proof is, by the combustion of gunpowder: some of which is put in a spoon, and then covered with the spirit to be tried, which is set on fire; if the gunpowder be kindled, the spirit is supposed to be strong, and *vice versa.* But a small quantity of spirits will always kindle gunpowder, and a large quantity never. Another proof is by the carbonate of potass, which attracts the water, and dissolves in it, while the alcohol swims above, and the strength of the spirits is judged of by its quantity. But all these are uncertain; and dependence can only be put in the proof by hydrometers, or some other contrivance for ascertaining the weight of a given quantity at a given temperature.

In this country, alcohol is procured from an infusion of malt, and before its rectification is termed Whisky. In the East Indies, arrack, a spirituous liquor, is distilled from rice; in the West Indies, rum from the sugar cane : and in France and Spain, brandy from wine. Of all these, the French brandy is the finest spirit; for the others are more or less impregnated with essential oils, of which it is almost impossible to free them entirely. When any ardent spirit is re-distilled to procure alcohol, the water bath is commonly used, which gives a more equal and temperate heat, and improves the product. Gren says, that the addition of four pounds of well-burnt charcoal, and three or four ounces of sulphuric acid, previous to this rectification, destroys entirely the peculiar taste of malt spirit; and that a second rectification, with one pound of charcoal, and two ounces of sulphuric acid, affords an alcohol of very great purity. But the affinity of alcohol for water is so very strong, that it cannot be obtained entirely free from it by simple distillation. We must, therefore, abstract the water by means of some substance which has a stronger affinity for it than alcohol has. Carbonate of potass was formerly employed; but muriate of lime is preferable, because its affinity for water is not only very great, but by being soluble in alcohol, it comes in contact with every particle of the fluid. For this purpose, one part of muriate of lime, rendered perfectly dry by having been exposed to a red heat, and powdered after it becomes cold, is put into the still. Over this, three parts of highly rectified spirits are to be poured, and the mixture well agitated. By distillation with a very gentle heat, about two-thirds of the spirit will be obtained in the state of perfectly pure alcohol.

The chemical properties of alcohol have been already mentioned.

Medical uses.—On the living body alcohol acts as a most violent stimulus. It coagulates all the albuminous and gelatinous fluids, and corrugates all the solids. Applied externally, it strengthens the vessels, and thus may restrain passive hæmorrhagies. It instantly contracts the extremities of the nerves it touches, and deprives them of sense and motion; by this means easing them of pain, but at the same time destroying their use. Hence, employing spiritous liquors in fomentations, notwithstanding the specious titles of vivifying, heating, restoring mobility, resolving, dissipating, and the like, usually attributed to them, may sometimes be attended with unhappy consequences. These liquors received undiluted into the stomach, produce the same effects, contracting all the solid parts which they touch, and destroying, at least for a time, their use and office; if the quantity be considerable, a palsy or apoplexy follows, which ends in death. Taken in small quantity, and diluted, they act as a cordial and tonic; if longer continued, the senses are disordered, voluntary motion is destroyed, and at length the most fatal consequences ensue. Vinous spirits, therefore, in small doses, and properly diluted, may be applied to useful purposes in the cure of diseases; whilst in larger ones they produce the most deleterious effects.

Officinal Preparations.

Alcohol. *L. D.*
——— ammoniatum. *E.*
Æther sulphuricus. *E. L. D.*
——————— cum alcohole. *E. L. D.*
Oleum vini. *L.*
Æther nitrosus. *D.*
Spiritus ætheris nitrosi. *E. L. D.*

It also enters into the preparation of all tinctures and distilled spirits, and is used undiluted in

Spiritus ammoniæ fœtidus. *D.*
——— lavandulæ spicæ. *E. L.*
——— rorismarinis. *E. L.*
Tinctura assæfœtidæ. *E. L. D.*
——— balsami Peruviani. *L.*
——— benzoes composita. *L. E. D.*
——— camphoræ. *E. L.*
——— guaiaci. *E. D.*
——— moschi. *D.*
——— myrrhæ. *D.*
——— saponis. *E.*
——— toluiferæ balsami. *E. L. D.*

ALCOHOL DILUTUM. *Ed.* *Spiritus vinosus tenuior. Lond. Dub.*

Diluted alcohol. Spirit of wine. Proof spirit.

ALCOHOL mixed with an equal quantity of water, being somewhat weaker than proof spirit; its specific gravity is to that of distilled water as 935 to 1000 (*Ed.*) The London and Dublin colleges order it of the specific gravity of 930, which, according to the former, contains 55 parts of pure alcohol, and 45 of water.

Diluted alcohol should always be prepared, by mixing rectified spirit with water; but it is hardly to be expected that apothecaries will either be at the trouble or expence of preparing it in this manner. Instead of it, an impure spirit of the requisite strength is commonly employed. The diluted alcohol of the Edinburgh college is somewhat weaker than that of the two other colleges; but besides that it is more convenient for their mode of preparing it, this will be attended with no disadvantage, as it is still sufficiently strong for any ordinary purpose.

Officinal Preparations.

Alcohol ammoniatum. *L. D.*

And all the tinctures and distilled spirits, except those made with alcohol. It is also used, somewhat extravagantly, in the preparation of various extracts.

TABLE *of various mixtures of alcohol and water, shewing their Specific Gravities according to Gilpin, and their degrees according to Baumé's hydrometer, and in Clarke's hydrometer, used by the revenue.*

Water.	Alcohol.	Specific Gravities. 60°	55°	Baumé. 55°
0	100	.825	.82736	38
10	100	.84568	.84802	31+
20	100	.86208	.86441	30—
30	100	.87569	.87796	29+
40	100	.88720	.88945	27+
50	100	.89707	.89933	25+
60	100	.90549	.90768	23—
70	100	.91287	.91502	22
80	100	.91933	.92145	21—
90	100	.92499	.92707	20—
100	100	.93002	.93208	19—
100	90	.93493	.93696	19+
100	80	.94018	.94213	18
100	70	.94579	.94767	17—
100	60	.95181	.95357	16—
100	50	.95804	.95966	16
100	40	.96457	.96575	15
100	30	.97074	·97181	14+
100	20	.97771	.97847	13
100	10	.98654	.98702	12
100	0	1.		10

Sp.Gr. 60°	Clarke.
833	Spirit. of wine.
858	1 to 2
881	1 to 3
891	1 to 4
896	1 to 5
900	1 to 6
904	1 to 7
907	1 to 8
909	1 to 9
910	1 to 10
913	1 to 15
916	1 to 20
920	Proof.
926	1 in 20
928	1 in 15
932	1 in 10
933	1 in 9
934	1 in 8
936	1 in 7
938	1 in 6
942	1 in 5
945	1 in 4
954	1 in 3
964	1 in 2

ALLIUM.

Willd. g. 626.—*Hexandria Monogynia.*—Nat. ord. *Liliaceæ.*
Sp. 14. ALLIUM SATIVUM. *Ed. Lond. Dub.*
Garlic.

Off.—Radix. The root.

GARLIC is a perennial bulbous-rooted plant, which grows wild in Sicily, and is cultivated in our gardens. The root consists of five or six small bulbs, called *cloves*, inclosed in one common membranous coat, but easily separable from each other. All the parts of this plant, but more especially the roots, have a strong offensive, very penetrating, and diffusible smell, and an acrimonious, almost caustic taste. The root is full of a limpid juice, of which it furnishes almost a fourth part of its weight by expression. It also loses about half its weight by drying, but scarcely any of its smell or taste. By decoction its virtues are entirely destroyed; and by distillation it furnishes a small quantity of a yellowish essential oil, heavier than water, which possesses the sensible qualities of the garlic in an eminent degree. Its peculiar virtues are also in some degree extracted by alcohol and acetous acid.

By Neumann's analysis, it lost two thirds of its weight by exsiccation. By decoction from 960 parts, water extracted 380, and the residuum yielded 27 to alcohol, and was reduced to 40. Alcohol applied first, extracted 123, the residuum yielded 162 to water, and was reduced to 40. In both cases the alcoholic extract was unctuous and tenacious, and precipitated metallic solutions. But the active ingredient was a thick ropy essential oil, according to Hagen heavier than water, not amounting to more than 1.3 of the whole, in which alone resided the smell, the taste, and all that distinguishes the garlic.

Medical use.—Applied externally, it acts successively as a stimulant, rubefacient, and blister. Internally, from its very powerful and diffusible stimulus, it is often useful in diseases of languid circulation and interrupted secretion. Hence, in cold leuco-phlegmatic habits, it proves a powerful expectorant, diuretic, and, if the patient be kept warm, sudorific; it has also been by some supposed to be emmenagogue. For the same reason, in cases in which a phlogistic diathesis, or irritability, prevails, large doses of it may be very hurtful.

It is sometimes used by the lower classes as a condiment, and also enters as an ingredient into many of the epicure's most favourite sauces. Taken in moderation, it promotes digestion; but in excess, it is apt to produce headach, flatulence, thirst, febrile heat, and inflammatory diseases, and sometimes occasions a discharge of blood from the hæmorrhoidal vessels.

In fevers of the typhoid type, and even in the plague itself, its virtues have been much celebrated.

Garlic has been said to have sometimes succeeded in curing obstinate quartans, after cinchona had failed. In catarrhal disorders of the breast; asthma, both pituitous and spasmodic; flatulent colics; hysterical and other diseases, proceeding from laxity of the solids, it has generally good effects: it has likewise been found serviceable in some hydropic cases. Sydenham relates, that he has known the dropsy cured by the use of garlic alone; he recommends it chiefly as a warm strengthening medicine in the beginning of the disease.

It is much recommended by some as an anthelmintic, and has been frequently applied with success externally as a stimulant to indolent tumours, in cases of deafness proceeding from atony or rheumatism, and in retention of urine, arising from debility of the bladder.

Garlic may either be exhibited in substance, and in this way several cloves may be taken at a time without inconvenience, or the cloves cut into slices may be swallowed without chewing. This is the common mode of exhibiting it for the cure of intermittents.

The expressed juice, when given internally, must be rendered as palatable as possible, by the addition of sugar and lemon juice. In deafness, cotton moistened with the juice is introduced within the ear, and the application renewed five or six times in one day.

Infusions in spirit, wine, vinegar, and water, although containing the whole of its virtues, are so acrimonious, as to be unfit for general use; and yet an infusion of an ounce of bruised garlic in a pound of milk, was the mode in which Rosenstein exhibited it to children afflicted with worms.

But by far the most commodious form for administering garlic, is that of a pill or bolus conjoined with some powder, corresponding with the intention of giving the garlic. In dropsy, calomel forms a most useful addition. It may also sometimes be exhibited with advantage in the form of a clyster.

Garlic made into an ointment with oils, &c. and applied externally, is said to resolve and discuss indolent tumours, and has been by some greatly esteemed in cutaneous diseases. It has likewise sometimes been employed as a repellent. When applied under the form of a poultice to the pubis, it has sometimes proved effectual in producing a discharge of urine, when retention has arisen from a want of due action in the bladder. Sydenham assures us, that among all the substances which occasion a derivation or revulsion from the head, none operates more powerfully than garlic applied to the soles of the feet: with this intention he used it in the confluent small-pox, about the eighth day, after the face began to swell; the root cut in pieces, and tied in a linen cloth, was applied to the soles, and renewed once a-day till all danger was over.

Officinal Preparation.—Syrupus allii. *D.*

Sp. 43. ALLIUM CEPA. *Cepa. Dub.*
Onion.

Officinal—Radix. The root.

THIS is also a perennial bulbous-rooted plant. The root is a simple bulb, formed of concentric circles. It possesses in general the same properties as the garlic, but in a much weaker degree. Neumann extracted from 480 parts of the dry root, by means of alcohol, 360, and then by water 30; by water applied first 395, and then by alcohol 30: the first residuum weighed 56, and the second 64. By distillation the whole flavour of the onions passed over, but no oil could be obtained.

Medical uses.—Onions are considered rather as an article of food than of medicine: they are supposed to yield little or no nourishment, and when eaten liberally produce flatulencies, occasion thirst, headachs, and turbulent dreams; in cold phlegmatic habits, where viscid mucus abounds, they doubtless have their use; as by their stimulating quality they tend to excite appetite, and promote the secretions: by some they are strongly recommended in suppressions of urine, and in dropsies. The chief medicinal use of onions in the present practice is in external applications, as a cataplasm for suppurating tumours, &c.

ALOE PERFOLIATA. *Ed.*

Wild. g.659. sp.3.—Hexandria Monogynia.—Nat.ord. *Liliaceæ.*

A PERENNIAL plant, of which there are many varieties which grow in the south of Europe, Asia, Africa, and America. But Thunberg says, and the Dublin college agree with him, that the finest aloes are prepared from the *Aloe spicata*, the second species of Wildenow, which grows at the Cape of Good Hope.

During four years that the Cape of Good Hope was in possession of the British, more than 300,000 pounds, the produce of that settlement, were imported into England; and as this quantity was infinitely greater than could be required for the purposes of medicine, it is not improbable, that, as Mr. Barrow states, its principal consumption was by the London porter brewers.

1. ALOE SOCOTORINA. *Lond. Ed. Dub.* (Sp. 2. ALOE SPICATA. *Dub.*) Socotorine aloes.

Officinal.—Gummi-resina. The gum-resin.

THIS article is brought, wrapt in skins, from the island of Socotora in the Indian ocean. This sort is the purest of the three in use: it is of a glossy surface, clear, and in some degree pellucid; in mass, of a yellowish red colour, with a purple cast; when reduced to powder, of a bright golden colour. It is hard and friable in the winter, somewhat pliable in summer, and grows soft between the fingers. Its taste is bitter and disagreeable, though accompanied with some aromatic flavour; the smell is not very unpleasant, and somewhat resembles that of myrrh.

It is prepared in July, by pulling off the leaves, from which the juice is expressed, and afterwards boiled and skimmed. It is then preserved in skins, and dried in August in the sun. According to others, the leaves are cut off close to the stem, and hung up. The juice which drops from them without any expression, is afterwards dried in the sun.

2. BARBADOES, or HEPATIC ALOES. *Lond. Ed.* Aloe sinuata? *Dub.*

HEPATIC aloes is not so clear and bright as the foregoing sort; it is also of a darker colour, more compact texture, and for the most part drier. Its smell is much stronger and more disagreeable; the taste intensely bitter and nauseous, with little or nothing of the aromatic flavour of the socotorine. The best hepatic aloes come from Barbadoes in large gourd shells, and an inferior sort of it, which is generally soft and clammy, is brought over in casks. In Barbadoes the plant is pulled up by the roots, and carefully cleaned from the earth and other impurities. It is then sliced into small hand-baskets and nets, which are put into large iron boilers or cauldrons with water, and boiled for ten minutes, when they are taken out, and fresh parcels supplied till the liquor is strong and black, which is then strained into a deep vat, narrow at bottom, where it is left to cool and to deposit its feculent parts. Next day the clear liquor is drawn off by a cock, and again committed to a large iron vessel. At first it is boiled briskly, but towards the end it is slowly evaporated, and requires constant stirring to prevent burning. When it becomes of the consistence of honey, it is poured into gourds or calabashes for sale, and hardens by age.

3. FETID, CABALLINE, or HORSE ALOES.

THIS sort is easily distinguished from both the foregoing, by its strong rank smell; although, in other respects, it agrees pretty much with the hepatic, and is not unfrequently sold in its stead. Sometimes the caballine aloes is prepared so pure and bright, as not to be distinguishable by the eye even from the socotorine; but its offensive smell, of which it cannot be divested, readily betrays it. It is now excluded from the list of almost all modern Pharmacopœias, and is employed solely by farriers.

From sixteen ounces of aloes Neumann extracted near fifteen by means of alcohol. From the residuum water took up one drachm, about an ounce of impurities being left; on inverting the procedure and applying water first, he obtained but thirteen ounces and a half of watery extract, and from the residuum alcohol dissolved an ounce and a half. According to this analysis, 1000 parts of aloes contain about 78 soluble in water only, or analogous to gum, 930 soluble in alcohol only, or resinous, and 895 soluble both in alcohol, and in water or extractive. The constituent principles of aloes therefore appear to be resin and extractive. Dr. Lewis also remarks, that decoctions of aloes let fall a precipitate, as they cool, probably from extractive being more soluble in boiling than in cold water. He also proved the hepatic aloes to contain more resin and less extractive than the socotorine, and this less than the caballine. The resins of all the sorts, purified by alcohol, have little smell; that obtained from the socotorine has scarce any perceptible taste; that of the hepatic, a slightly bitterish relish; and the resin of the caballine, a little more of the aloetic flavour. The extractive obtained separately from any of the kinds, is less disagreeable than the crude aloes: the extractive of socotorine aloes has very little smell, and is in taste not unpleasant; that of the hepatic has a somewhat stronger smell, but is rather more agreeable in taste than the extract of the socotorine: the extractive of the caballine retains a conderable share of the peculiar rank smell of this sort of aloes, but its taste is not much more unpleasant than that of the extractive obtained from the two other sorts.

Medical use.—Aloes is a bitter stimulating purgative, exerting its action chiefly on the rectum. In doses of from 5 to 15 grains it empties the large intestines, without making the stools thin; and likewise warms the habit, quickens the circulation, and promotes the uterine and hæmorrhoidal fluxes. If given in so large a dose as to purge effectually, it often occasions an irritation about the anus, and sometimes a discharge of blood.

It is frequently employed in cases of suppression of the menses, or of the hæmorrhoidal discharge; but it is particularly serviceable in habitual costiveness, to persons of a phlegmatic temperament and sedentary life, and where the stomach is oppressed and weakened. It has, however, a tendency to induce and augment hæmorrhoidal affections; and with those who are liable to such complaints, it should be avoided. In dry bilious habits aloes proves injurious, immoderately heating the body, and inflaming the bowels.

Some are of opinion, that the purgative virtue of aloes resides entirely in its resin; but experience has shewn, that the pure resin has little or no purgative quality, and that the extractive part separated from the resinous, acts more powerfully than the crude aloes. If the aloes indeed be made to undergo long coction in the preparation of the gummy extract, its cathartic power will be considerably lessened, not from the separation of the resin, but from an alteration made in the extractive itself by the action of the heat and air. The strongest vegetable cathartics become mild by a similar treatment.

Socotorine aloes, as already observed, contains more extractive than the hepatic; and hence is likewise found to purge more, and with greater irritation. The first sort, therefore, is most proper where a stimulus is required, as for promoting or exciting the menstrual flux; whilst the latter is better calculated to act as a common purge.

Aloes is administered either
a. Simply, or
b. In composition:
1. With purgatives. Soap, scammony, colocynth, rhubarb.
2. With aromatics. Canella.
3. With bitters. Gentian.
4. With emmenagogues. Iron, myrrh.

It is exhibited in the form of
a. Powder; too nauseous for general use.
b. Pill; the most convenient form.
c. Solution in wine or diluted alcohol.

Officinal Preparations.

Extractum colocynthidis compositum. *L. D.*
Pulvis aloes cum canella. *L.*
———— cum guaiaco. *L.*
———— cum ferro. *L.*
Pilulæ aloes. *E. L. D.*
———— cum assa fœtida. *E.*
———— cum colocynthide. *E. D.*
———— cum myrrha. *L. E. D.*
———— cum zingibere. *D.*
—— rhei compositæ. *E.*
—— scammonii compositæ cum aloe. *L.*
Tinctura aloes. *E. L. D.*
———— ætherea. *E.*
———— cum myrrha. *E. D.*
—— benzoes composita. *L. E. D.*
—— rhei et aloes. *E.*
Vinum aloes. *E. L. D.*

ALTHÆA OFFICINALIS. *Ed.*

Willd. g. 1289. *sp.* 1.—*Smith's Flor. Brit. g.* 316. *sp.* 1.—*Monadelphia Polyandria.*—Nat. ord. *Columnaceæ.*

Althæa. Lond. Marsh-mallow.

Off.—Radix. Folium. Radix condit. The root and leaves.

The marsh-mallow is a perennial indigenous plant, which is found commonly on the banks of rivers, and in salt marshes.

The whole plant, but especially the root, abounds with mucilage. The roots are about the thickness of a finger, long and fibrous. When peeled and dried, they are perfectly white.

From 960 parts of the dry root, Neumann extracted by water 650, and afterwards with alcohol 41; by alcohol applied first 360, and afterwards by water 348. Lewis extracted by alcohol only 120, and he observed that the alcoholic extract was sweeter than the watery, and had the smell peculiar to the root. The substance soluble in this instance, both in alcohol and water, is probably saccharine. From 960 parts of the dry leaves Neumann extracted by water 340, and then by alcohol 213: by alcohol first 280, and then by water 218. The residuum of the root was only one fourth; that of the leaves one half of the whole. The root is therefore the most mucilaginous. The decotion of the root reddens turnsole, and gelatinizes silicized potass.

Med. use.—It is used as an emollient and demulcent, in diseases attended with irritation and pain, as in various pulmonary complaints, and in affections of the alimentary canal and urinary organs; and it is applied externally in emollient fomentations, gargles, and clysters.

Officinal Preparations.

Decoctum althææ officinalis. *E.*
Syrupus althææ officinalis. *E. L.*

AMMONIACUM. *Gummi resina. Lond. Dub. Ed.*
Ammoniac, a gum-resin.

AMMONIACUM is a concrete, gummy-resinous juice, brought from the East Indies, usually in large masses, composed of little lumps or tears, of a milky colour, but soon changing, upon being exposed to the air, to a yellowish hue. We have no certain account of the plant which affords this juice; it is said to grow in Nubia, Abyssinia, and the interior of Egypt; the seeds usually found among the tears resemble those of the umbelliferous class, and it is not improbable that it is an exudation from a species of ferula. Such tears as are large, dry, free from small stones, seeds, or other impurities, should be picked out and preferred for internal use; the coarser kind is purified by solution, colature, and careful inspissation; but unless this be artfully managed, the gum will lose a considerable deal of its more volatile parts. There is often vended in the shops, under the name of strained gum ammoniacum, a composition of ingredients much inferior in virtue.

Ammoniacum has a nauseous sweet taste, followed by a bitter one; and a peculiar smell, somewhat like that of galbanum, but more grateful: it softens in the mouth, and grows of a white colour upon being chewed. It softens by heat, but is not fusible; when thrown upon live coals, it burns away in flame; it is in some degree soluble in water and in vinegar, with which it assumes the appearance of milk; but the resinous part, amounting to about one half, subsides on standing.

Neumann extracted from 480 parts, 360 by alcohol, and then by water 105; by water applied first 410, and then by alcohol 60. Alcohol distilled from it arose unchanged, but water acquired a sweetish taste, and the smell of the ammoniac. The solution in alcohol is transparent; but on the addition of water, becomes milky. It therefore seems to consist principally of a substance soluble both in water and in alcohol, combined with some volatile matter.

Medical use.—The general action of gum-ammoniac is stimulant. On many occasions, in doses of from ten to thirty grains, it proves a valuable antispasmodic, deobstruent, or expectorant. In large doses it purges gently, excites perspiration, and increases the flow of urine. It is used with advantage to promote expectoration in some pulmonary diseases; in dropsical affections, to augment the flow of urine, and to support the salivation in small pox. It is also an useful deobstruent; and is frequently prescribed for removing obstructions of the abdominal viscera, and in hysterical disorders, occasioned by a deficiency of the menstrual evacuations. In long and obstinate colics, proceeding from viscid matter lodged in the intestines, this gummy resin has produced happy effects, after purges and the common carminatives had been used in vain. Externally, it is supposed to soften and ripen hard tumours. A solution of it in vinegar has been recommended by some for resolving even scirrhous swellings.

It is exhibited internally,

a. In solution, combined with vinegar, vinegar of squills, assa fœtida, &c.
b. In pills, with bitter extracts, myrrh, assa fœtida.
c. And externally, combined with turpentine, common plaster, &c.

Officinal Preparations.

Ammoniacum purificatum. *L.*
Lac ammoniaci. *L. D.*
Pilulæ scillæ. *E. L.*
Emplastrum gummosum. *E.*
——— ammoniaci cum hydrargyro. *L.*

AMOMUM.

Willd g. 4.—*Monandria Monogynia.*—Nat. ord. *Scitamineæ.*
Sp. 1. AMOMUM ZINGIBER, *Ed.* *Zingiber*, *Lond. Dub.*
Ginger.

Officinal—Radix siccata. Radix condita ex India allata. The dried root, and the preserved root brought from India.

GINGER is a perennial plant, indigenous in the East Indies, but now cultivated in the West-India islands. It is cultivated there very much in the same manner as potatoes are here, and is fit for digging once a-year, unless for preserving in syrup, when it should be dug at the end of three or four months, at which time it is tender and full of sap.

Ginger is distinguished into two sorts, the black and the white. The former is rendered fit for preservation by means of boiling water, the latter by insolation; and as it is necessary to select the fairest and roundest sorts for exposure to the sun, white ginger is commonly one third dearer than black.

Black ginger consists of thick and knotty roots, internally of an orange or brownish colour, externally of a yellow-grey. White ginger is less thick and knotty, internally of a reddish-yellow, and externally of a whitish-grey or yellow. It is firm and resinous, and more pungent than the black. Pieces which are worm-eaten, light, friable, or soft, and very fibrous, are to be rejected.

Candied ginger should be prepared in India, from the young and succulent roots. When genuine, it is almost transparent. That manufactured in Europe is opaque and fibrous.

Ginger has a fragrant smell, and a hot, biting, aromatic taste. Neumann obtained by distillation with water from 7680 parts of white ginger, about 60 of a volatile oil, having the smell and distinguishing flavour of the ginger, but none of its pungency. The watery extract was considerably pungent, and amounted to 2720, after which alcohol extracted 192 of a very pungent resin. Alcohol applied first extracted 660 of pungent resin, and water afterwards 2160 of a mucilaginous extract, with little taste, and difficulty exsiccated. The black ginger contained less soluble matter than the white.

Medical use.—Ginger is a very useful spice in cold flatulent colics, and in laxity and debility of the intestines; it does not heat so much as the peppers, but its effects are more durable. It may also be applied externally as a rubefacient.

Officinal Preparations.

Syrupus amomi zingiberis. *E. D.*
Tinctura zingiberis. *L. D.*
Acidum sulphuricum aromaticum. *E.*
Confectio opiata. *L.*
Electuarium scammonii. *L. D.*
Infusum sennæ. *L.*
Pulvis aromaticus. *L. E. D.*
——— scammonii compositus. *L.*
——————— cum aloe. *L.*
——— sennæ compositus. *L.*
Pilulæ aloes cum zingibere. *D.*
——— scilliticæ. *L. D.*
Syrupus spinæ cervinæ. *L.*
Tinctura cinnamomi composita. *L.*
Trochisci magnesiæ. *L.*
Vinum aloes socotorinæ. *E.*

Sp. 3. AMOMUM ZEDOARIA. *Dub.*
Long Zedoary.

Off.—Radix. The root.

THE zedoary is perennial, and grows in Ceylon and Malabar. The roots come to us in pieces, some inches in length, and about a finger thick. Externally they are wrinkled, and of an ash-grey colour, but internally they are brownish-red. The best kind comes from Ceylon, and should be firm, heavy, of a dark colour within, and neither worm-eaten nor very fibrous. It has an agreeably fragrant smell, and a warm, bitterish, aromatic taste.

In distillation with water, it yields a volatile oil, heavier than water, possessing the smell and flavour of the zedoary in an eminent degree; the remaining decoction is almost simply bitter. Spirit likewise brings over some small share of its flavour: nevertheless, the spiritous extract is considerably more grateful than the zedoary itself. From 7680 parts Neumann got 2720 of watery extract, and afterwards 140 of almost insipid resin; by applying alcohol first, 720, and water afterwards, 2400, much bitterer than the original watery extract.

Officinal Preparation.

Confectio Aromatica. *L.*

Sp. 7. AMOMUM CARDAMOMUM. *Cardamomum Minus. Dub.*
Sp. 10. ——— REPENS. *Ed.* *Cardamomum Minus. Lond.*
Lesser Cardamom seeds.

Off.—Semen.

The London and Edinburgh colleges, on the authority of Sonnerat, have supposed these seeds to be the product of the latter species, while the Dublin college, with Murray, Willdenow, and all the foreign pharmaceutical writers, ascribe them to the former. Both species are natives of India.

Cardamom seeds are a very warm, grateful, pungent aromatic, and frequently employed as such in practice: they are said to have this advantage, that, notwithstanding their pungency, they do not, like the peppers, immoderately heat or inflame the bowels. Both water and rectified spirit extract their virtues by infusion, and elevate them in distillation; with this difference, that the tincture and distilled spirit are considerably more grateful than the infusion and distilled water: the watery infusion appears turbid and mucilaginous, the tincture limpid and transparent. From 480 parts Neumann got about 20 of volatile oil, 15 of resinous extract, and 45 of watery. The husks of the seeds, which have very little smell or taste, may be commodiously separated, by committing the whole to the mortar, when the seeds will readily pulverize, so as to be freed from the husk by the sieve: this should not be done till just before using them; for if kept without the husks, they soon lose considerably of their flavour.

Officinal Preparations.

Tinctura amomi cardamomi. *E. L. D.*
——— cardamomi composita. *L. D.*
——— cinnamomi composita. *E. L.*
——— gentianæ composita. *L.*
——— rhei palmati. *E. L. D.*
————— cum aloe. *E.*
——— sennæ. *L. D.*
Vinum aloes socotorinæ. *E.*
——— rhabarbari. *L.*
Extractum colocynthidis compositum. *L. D.*
Confectio aromatica. *L.*
Electuarium aromaticum. *D.*
Pulvis aromaticus. *E. L. D.*
Pilulæ scillæ maritimæ. *E.*
Infusum sennæ. *D.*
————— cum tamarindis. *D.*

AMYGDALUS COMMUNIS. *Ed.*

Willd. g. 981, *sp.* 2. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ.*
a, *Amygdalus dulcis. Ed. Amygdalæ dulces. Lond. Dub.*
b, *Amygdalæ amaræ. Lond.*

Off.—Nucleus. The kernel; sweet and bitter almonds.

The almond tree nearly resembles the peach. It originally came from Syria and Barbary, but is now much cultivated in the south of Europe. There is no apparent difference betwixt the trees which produce the sweet and bitter almonds, and very little betwixt the kernels themselves; and it is said that the same tree has, by a difference in culture, afforded both.

The almond is a flattish kernel, of a white colour, and of a soft sweet taste, or a disagreeable bitter one. The skins of both sorts are thin, brownish, unpleasant, and covered with an acrid powdery substance. They are very apt to become rancid on keeping, and to be preyed on by insects, which eat out the internal part, leaving the almond to appearance entire. To these circumstances regard ought to be had in the choice of them.

Sweet almonds are of greater use in food than as medicine, but they are reckoned to afford little nourishment; and when eaten in substance, are not easy of digestion, unless thoroughly comminuted. They are supposed, on account of their unctuous quality, to obtund acrimonious juices in the primæ viæ: peeled sweet almonds, eaten six or eight at a time, sometimes give present relief in the heartburn.

Bitter almonds have been found poisonous to dogs and some other animals; and a water distilled from them, when made of a certain degree of strength, has had the same effects. Nevertheless, when eaten, they appear innocent to most men, and are every day used in cookery, on account of their agreeable flavour; but there are some habits, in which the smallest quantity produces urticaria, and other unpleasant symptoms. The similarity of the smell induced Mr. Schrader to suppose that bitter almonds contained prussic acid, and he verified his conjecture by analysis. Since that time it has been found, that this acid exists but in a particular state, in all the bitter poisonous vegetables, and that in its pure state it is poisonous.

Both sorts of almonds yield, on expression, a large quantity of oil, which separates likewise, upon boiling the almonds in water, and is gradually collected on the surface.

The oils obtained by expression from both sorts of almonds are in their sensible qualities the same. They should be perfectly free from smell and taste, and possess the other properties of fixed oils.

Medical use.—The general virtues of these oils are, to blunt acrimonious humours, and to soften and relax the solids: hence their use internally, in tickling coughs, heat of urine, pains and inflammations; and externally, in tension and rigidity of particular parts. On triturating almonds with water, the oil and water unite together, by the mediation of the amylaceous matter of the kernel, and form an unctuous milky liquor, called an emulsion, which participates in some degree of its emollient virtue; but they have this advantage above the pure oil, that they may be given in acute or inflammatory disorders, without danger of the ill effects which the oil might sometimes produce; since emulsions do not turn rancid or acrimonious by heat, as all the oils of this kind in a little time do. As the bitter almond imparts its peculiar taste when treated in this way, the sweet almonds alone are employed in making emulsions.

Several unctuous and resinous substances, of themselves not miscible with water, may, by trituration with almonds, be easily mixed with it into the form of an emulsion; and are thus excellently fitted for medicinal use. In this form camphor, and the resinous purgatives, may be commodiously taken.

Officinal Preparations.

Oleum fixum amygdalæ dulcis. *E. L.*
Emulsio amygdalæ dulcis. *E. L.*
——— arabica. *E. D.*
——— camphorata. *E. L.*

AMYRIS.

Willd. g. 755. *Octandria Monogynia.*—Nat. ord. *Dumosa.*
Sp. 2. AMYRIS ELEMIFERA. *Elemi. Lond. Dub.*
Elemi. A resin.

Off.—Resina. The resin.

THE tree which furnishes elemi grows in Carolina and Spanish America. In dry weather, and especially at full moon, incisions are made in the bark, from which a resinous juice flows, and is left to harden in the sun. It is brought to us in long roundish cakes, generally wrapped up in flag leaves. The best sort is softish, somewhat transparent, of a pale whitish yellow colour, inclining a little to green, of a strong, not unpleasant smell, resembling somewhat that of fennel. Dr. Wright says, that on wounding the bursera gummifera, a thick milky liquor flows, which soon concretes into a resin exactly resembling the elemi of the shops. Of one hundred parts ninety-four dissolve in alcohol, and part of its fragrance rises along with this menstruum in distillation: distilled with water it yields 6.4 of pale-coloured, thin, fragrant, essential oil: its only constituents, therefore, are resin and essential oil. It gives name to one of the officinal unguents, and is at present scarcely used in any other way; though it is certainly preferable for internal purposes to some others which are held in greater esteem.

Officinal Preparations.

Unguentum elemi. *L. D.*

Sp. 18. AMYRIS ZEYLANICA.

THE elemi which comes from the East-Indies is said to be the produce of this species.

Sp. 6. AMYRIS GILEADENSIS.

Off.—Resina liquida. *Ed.* Balsamum Gileadense. Balsam of Gilead. A liquid resin.

THIS substance, which has also had the name of Balsamum Judaicum, Syriacum, de Mecca, Opo-balsamum, &c. is a resinous juice, obtained from an evergreen tree, growing spontaneously, particularly on the Asiatic side of the Red sea, near Mecca. The true opo-balsamum, according to Alpinus, is at first turbid and white, of a very strong pungent smell, like that of turpentine, but much sweeter; and of a bitter, acrid, astringent taste: upon being kept for some time, it becomes thin, limpid, of a greenish hue, then of a golden yellow, and at length of the colour of honey.

This balsam is in high esteem among the eastern nations, both as a medicine, and as an odoriferous unguent and cosmetic. But in Europe it is never obtained genuine; and as all the signs of its goodness are fallacious, it has been very rarely employed. Nor need we regret it; for any of the other resinous fluids, such as the balsam of Canada or Copaiba, will answer every purpose full as well.

The dried berries of this tree were formerly kept under the title of Carpo-balsamum, and the dried twigs under that of Xylo-balsamum. Although Willdenow has inserted the amyris opobalsamum as a distinct species, he thinks they are the same.

ANCHUSA TINCTORIA. *Ed.*

Willd. g. 277, *sp.* 7. *Pentandria Monogynia.*—Nat. ord. *Asperifoliæ.*

Anchusa. Dub.

Alkanet.

Off.—Radix. The root.

THIS plant is a native of Europe: it is sometimes cultivated in our gardens; but the greatest quantities are raised in Germany or France, particularly about Montpelier, from whence the dried roots are usually imported to us. The alkanet root produced in England is much inferior in colour to that brought from abroad; the English being only lightly reddish, the others of a deep purplish red; and it has been suspected, but without sufficient foundation, that the foreign roots owe part of their colour to art. The cortical part of the root is of a dusky red, and imparts an elegant deep red to alcohol, oils, wax, and all unctuous substances, but not to watery liquors.

Alkanet root has little or no smell; when recent, it has a bitterish astringent taste, but when dried scarcely any. Its chief use is for colouring oils, ointments, and plasters. As the colour is confined to the cortical part, the small roots are best, having proportionally more bark than the large.

ANETHUM.

Willd. g. 560. *Smith, g.* 151. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Willd. sp. 1. ANETHUM GRAVEOLENS. *Lond.*

Dill.

Off.—Semen. The seed.

DILL is an annual umbelliferous plant, cultivated in gardens, as well for culinary as medical use. The seeds are of a pale yellowish colour, in shape nearly oval, convex on one side, and flat on the other. Their taste is moderately warm and pungent; their smell aromatic, but not of the most agreeable kind. The seeds are recommended as a carminative in flatulent colics.

Officinal Preparation.

Aqua distillata anethi. *L.*

Willd. sp. 3. *Smith, sp.* 1. ANETHUM FOENICULUM. *Ed.*

Fœniculum Dulce. Lond. Dub.

Sweet Fennel.

Off.—Semen, radix. The root and seeds.

THIS is a biennial plant, of which there are four varieties. One of these, the common fennel, is indigenous on chalky cliffs. The sweet fennel, the variety of which is officinal, grows wild in Italy, but is also cultivated in our gardens. It is smaller in all its parts than the common, except the seeds, which are considerably larger. The seeds of the two sorts differ likewise in shape and colour. Those of the common are roundish, oblong, flattish on one side, and protuberant on the other, of a dark almost blackish colour; those of the sweet are longer, narrower, not so flat, generally crooked, and of a whitish or pale yellowish colour.

The seeds of both the fennels have an aromatic smell, and a moderately warm pungent taste: those of the *fœniculum dulce* are in flavour most agreeable, and have also a considerable degree of sweetness.

From 960 parts, Neumann obtained 20 of volatile oil, 260 watery extract, and afterwards some alcoholic extract, which could not be exsiccated, on account of its oiliness. By applying alcohol first he got 84 resinous extract, 120 fixed oil, and then by water 129 of a bitter extract.

Officinal Preparations.

Aqua distillata seminum fœniculi. *L. D.*
Oleum volatile seminum fœniculi. *D.*
Decoctum chamæmeli compositum. *D.*
Spiritus juniperi compositus. *D.*

ANGELICA ARCHANGELICA. *Ed.*

Willd. g. 543, *sp.* 1.—*Smith, g.* 138, *sp.* 1.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Angelica. Lond.

Angelica.

Off.—Radix, caulis, folium, semen. The root, stalk, leaves, and seeds.

ANGELICA is a large biennial umbelliferous plant. It grows spontaneously on the banks of rivers in alpine countries. It has been found wild in England, but it is doubtful whether it be indigenous. For the use of the shops, it is cultivated in gardens in different parts of Europe.

All the parts of angelica, especially the roots, have a fragrant aromatic smell, and a pleasant bitterish warm taste, glowing upon the lips and palate for a long time after they have been chewed. The flavour of the seeds and leaves is very perishable, particularly that of the latter, which, on being barely dried, lose the greatest part of their taste and smell: the roots are more tenacious of their flavour, though they gradually lose part of it. The fresh root, wounded early in the spring, yields an odorous yellow juice, which, slowly exsiccated, proves an elegant gum-resin, very rich in the virtues of the angelica. On drying the root, this juice concretes into distinct moleculæ, which, on cutting it longitudinally, appear distributed in little veins: in this state, they are extracted by alcohol, but not by watery liquors. Angelica roots are apt to grow mouldy, and to be preyed on by insects, unless thoroughly dried, kept in a dry place, and frequently aired. We apprehend, that the roots which are subject to this inconvenience, might be preserved, by dipping them in boiling spirit, or exposing them to its steam, after they are dried. Baumé says, that it is only the roots gathered in the spring that are subject to this inconvenience, and that when gathered in the autumn, they keep good several years. Roots only worm-eaten are as fit as ever for making a tincture, or affording volatile oil.

Angelica is one of the most elegant aromatics of European growth, though little regarded in the present practice. The root, which is the most efficacious part, is used in the aromatic tincture. The stalks make an agreeable sweetmeat.

Officinal Preparation.

Spiritus anisi compositus. *L.*

ANGUSTURA. *Cortex. Ed. Dub.*

Angustura.

The natural history of this bark is but imperfectly known. The first parcel of it was imported from Dominica in July 1788, with an account, ‘ that it had been found superior to ‘ Peruvian bark in the cure of fevers.’ Subsequent importations from the Spanish West Indies, either immediately, or through the medium of Spain, rendered it probable that it was the produce of South America. This has been fully established by the late travels of Humboldt in that country. He gave to Willdenow a dried specimen of the tree of which it is the bark, and that eminent botanist discovered it to be a new genus, to which he gave the name of BONPLANDIA, in honour of the botanical companion of Humboldt's travels. It belongs to the first order of the fifth class of Linné's system; and its generic characters are, calyx 5 titus.; coroll. 5 petal. recept. versus margin. adhærent.; 5 nectaria germen; obducent.; caps. 5 locularis; monosperm.

The appearance of the bark varies, accordingly, as it has been taken from larger or smaller branches. The outer surface is more or less wrinkled, and of a greyish colour, and the inner surface is of a dull brown. Its substance is of a yellowish brown colour. Its fracture is short and resinous. Its taste is intensely bitter, and slightly aromatic, leaving a strong sense of heat and pungency in the throat and fauces. The odour is peculiar. The powder is yellow.

According to the experiments related by Mr. Brande, from 3840 parts of angustura, there were extracted by alcohol, 144 of resin, and 300 of an acrid unctuous substance; the residuum yielded to water 1500 of dry gummy extract. Treated first with water, it gave 2110 grains of a clear brown extract, bitter, but not acrid, and afterwards, 161 of a resin of a light brown colour, and extremely acrid. By distillation it gave 26 of essential oil. The tincture is of a deep yellow colour, reddens infusion of turnsole, and becomes turbid and white on admixture with water. By repeated filtration a brownish resin is separated, and the transparent fluid has a pale yellow colour. I find that it is not precipitated by solution of gelatin, but by infusion of galls. It therefore does not contain tannin, but cinchonin, and it has the peculiar property of acquiring a deep red colour with red sulphate of iron, and depositing a purplish slate-coloured precipitate, remarkably different from what I have seen any other substance produce. Vauquelin says this precipitate is yellow; but in every other respect his analysis confirms mine.

Med. use.—As an aromatic bitter, it acts as a tonic and stimulant of the organs of digestion. It increases the appetite for food, removes flatulence and acidity arising from dyspepsia, and is a very effectual remedy in diarrhœa proceeding from weakness of the bowels, and in dysentery; and it possesses the singular advantage of not oppressing the stomach, as cinchona is apt to do. It does not cure intermittents.

It is exhibited,

1. In powder, in doses of from 5 to 20 grains, either alone or with rhubarb, magnesia, or carbonate of lime.
2. In infusion: the infusion of one drachm in four ounces of water may be used daily.
3. In tincture.
4. In watery extract.

Officinal Preparation.

Tinctura angusturæ. *D.*

ANTHEMIS.

Willd. g. 1517. *Smith, g.* 376. *Syngenesia Polygamia Superflua.* - Nat. ord. *Compositæ Radiatæ.*

Willd sp. 15. *Smith, sp.* 1. ANTHEMIS NOBILIS. *Ed. Chamæmelum. Lond. Dub.*

Chamomile.

Off.—Herba et flos. The herb and flowers.

CHAMOMILE is a perennial plant, indigenous in the south of England, but cultivated in our gardens for the purposes of medicine. The flowers have a strong, not ungrateful, aromatic smell, and a very bitter nauseous taste.

Their active constituents are bitter extractive, and essential oil. To the latter is to be ascribed their antispasmodic, carminative, cordial, and diaphoretic effects; to the former, their influence in promoting digestion.

Neumann obtained from 480 parts, 180 of alcoholic extract, and afterwards 120 of watery; and reversing the procedure, 240 of watery, and 60 alcoholic.

Med. use.—Chamomile flowers are a very common and excellent remedy, which is often used with advantage in spasmodic diseases, in hysteria, in spasmodic and flatulent colics, in suppression of the menstrual discharge, in the vomiting of puerperal women, in the afterpains, in gout, in podagra, in intermittents, and in typhus.

As chamomile excites the peristaltic motion, it is useful in dysentery, but is not admissible in all cases of diarrhœa. From its stimulating and somewhat unpleasant essential oil, chamomile is also capable of exciting vomiting, especially when given in warm infusion; and in this way it is often used to assist the action of other emetics.

Externally, chamomile flowers are applied as a discutient and emollient, in the form of clyster or embrocation, in colic, dysentery, and strangulated hernia, &c.

Chamomile flowers are exhibited,

1. In substance, in the form of powder, or rather of electuary, in doses of from half a drachm to two drachms, either alone, or combined with Peruvian bark, as for the cure of intermittent fevers.

2. In infusion, in the form of tea. This may either be drunk warm, for promoting the action of emetics, or cold, as a stomachic.

3. In decoction or extract. These forms contain only the extractive, and therefore may be considered as simple bitters.

4. The essential oil may be obtained by distillation. This possesses the antispasmodic powers in a higher degree than the simple flowers, but on the contrary, does not possess the virtues depending on the presence of the bitter extractive.

Officinal Preparations.

Extractum anthemidis nobilis. *L. E.*
Decoctum anthemidis nobilis. *E. L. D.*

Sp. 125. ANTHEMIS PYRETHRUM. *Ed. Pyrethrum. Lond. Dub.* Pellitory of Spain.

Off.—Radix. The root.

THIS plant, though a native of warm climates, as Barbary, bears the ordinary winters of this country, and often flowers successively from Christmas to May. The roots also grow larger with us than those with which the shops are usually supplied from abroad. They are seldom so big as the little finger, and the best are dry, compact, of a brown colour, and not easily cut with a knife.

Pellitory root has no sensible smell; its taste is very hot and acrid, but less so than that of arum; the juice expressed from it has scarce any acrimony, nor is the root itself so pungent when fresh, as after it has been dried. Neumann obtained from 960 parts of the dry root, only 40 of alcoholic extract, and afterwards 570 of watery, and by a reverse procedure, 600 of watery, and 20 of alcoholic extract. Both the alcoholic extracts were excessively pungent. Its acrimony, therefore, was derived from a resin.

Med. use.—The principal use of pellitory in the present practice is as a masticatory, for promoting the salival flux, and evacuating the viscid humours from the head and neighbouring parts; by this means it often relieves the toothach, some kinds of pains in the head, and lethargic complaints. A vinous infusion is also useful in debility of the tongue.

ANTIMONIUM. *Stibium.*

Antimony.

The physical and chemical properties of this metal have been already described.

Antimony is found,

- I. In its metallic state, at Stahlberg in Sweden, and Allemont in France.
- II. Mineralized with sulphur.
  - 1. Grey antimony.
    - *a.* Compact;
    - *b.* Foliated;
    - *c.* Striated (74 antimony, 29 sulphur, Bergmann);
    - *d.* Plumose (sulphuret of antimony with arsenic and iron, Berg.)
  - 2. Red antimony (hydroguretted sulphuret of antimony).
- III. Oxidized. Mongez.
- IV. Acidified.
  - 1. Muriated.
  - 2. Phosphated. Yellow ore of antimony, Razumousky.

The grey ore of antimony is the state in which it is officinal, and also that in which it is most commonly found.

SULPHURETUM ANTIMONII. *Ed. Dub. Antimonium. Lond.*

Sulphuret of antimony.

Whatever opinion may be formed of the nomenclature adopted by the Edinburgh college in general, the propriety of the change which they have introduced in this, and similar instances cannot be disputed; for while chemists, according to rational principles, designated simple substances by simple names, the same names continued to be given by pharmaceutical writers to compound states of these bodies. To have established, therefore, an uniformity of nomenclature in sciences so intimately allied, cannot fail to be considered as an improvement of the greatest importance.

Although sulphuretted antimony be a natural production, yet it is commonly sold in the form of loaves, which have been separated from the stony, and other impurities of the ore, by fusion, and a species of filtration. For the ore is melted in coni.

cal well-baked earthen pots, having one or more small holes in their apices. The fire is applied round and above these pots; and as soon as the sulphuretted antimony melts, it drops through the holes into vessels placed beneath to receive it, while the stony and other impurities remain behind. As antimony is very volatile, the mouths and joinings of the pots must be closed and luted. The upper part of the loaves thus obtained is more spongy, lighter, and impure, than the lower, which is therefore always to be preferred. These loaves have a dark-grey colour externally, but on being broken they appear to be composed of radiated striæ, of a metallic lustre, having the colour of lead. The goodness of the loaves is estimated from their compactness and weight, from the largeness and distinctness of the striæ, and from their being entirely vaporizable by heat. Lead has been sold for antimony; but its texture is rather foliated than striated, and it is not vaporizable. The presence of arsenic, which renders the antimony unfit for medical purposes, is known by its emitting the smell of garlic when thrown upon live coals, and by other tests mentioned under arsenic. The presence of manganese or iron is known by their not being volatilized by a red heat.

Antimony is obtained from its ores by gradually detonating in a large crucible four parts of sulphuretted antimony, three of crude tartar, and one and a half of dry nitrate of potass, reduced to a fine powder, and intimately mixed. The detonated mass is then to be fused, and poured into a heated mould, greased with a little fat, in which it is allowed to consolidate. It is then turned out, and the scoriæ are separated from the antimony, which will weigh about one fourth part of the sulphuret employed. The scoriæ are a mixture of sulphuret of potass and of antimony, and may be preserved for other purposes.

Another method of obtaining antimony, is by melting three parts of sulphuretted antimony with one of iron. The sulphur quits the antimony, and combines with the iron.

Med. use.—Formerly antimony was given internally; but as its action depended entirely on the acid it met with in the stomach, its effects were very uncertain, and often violent. Cups were also made of antimony, which imparted to wine that stood in them for some time an emetic quality. But both these improper modes of exhibiting this metal are now laid aside.

Sulphuretted antimony was employed by the ancients; in collyria, against inflammations of the eyes, and for staining the eye-brows black. Its internal use does not seem to have been established till towards the end of the fifteenth century; and even at that time it was by many looked upon as poisonous. But experience has now fully evinced, that it has no noxious quality, being often used, particularly in chronic eruptions; that some of the preparations of it are medicines of great efficacy; and that though others are very violent emetics and cathartics, yet even these, by a slight alteration or addition, lose their virulence, and become mild in their operation.

Off. prep.—Antimony is at present the basis of many officinal preparations, to be afterwards mentioned. But besides those still retained, many others have been formerly in use, and are still employed by different practitioners. The following table, drawn up by Dr. Black, exhibits a distinct view of the whole.

DR. BLACK'S TABLE OF THE PREPARATIONS OF ANTIMONY.

Medicines are prepared either from crude antimony, or from the pure metallic part of it called regulus.

From Crude Antimony.

I. By trituration.
    Antimonium præparatum. Lond.
II. By the action of heat and air.
    Flores antimonii sine addito.
    Vitrum antimonii. Ed.
    Antimonium vitrificatum. Lond.
    Vitrum antimonii ceratum. Ed.
III. By the action of alkalies.
    Hepar antimonii mitissimum.
    Regulus antimonii medicinalis.
    Hepar ad kermes minerale. *Geoffroi.*
    Hepar ad tinct. antimonii.
    Kermes minerale.
    Sulphur antimonii præcipitatum. Ed. et Lond.
IV. By the action of nitre.
    Crocus antim. mitissimus, *vulgo Regulus antim. medicinalis.*
    Crocus antimonii. Ed. et Lond.
    Antimonii emeticum mitius. Boerh.
    Antim. ustum cum nitro, *vulgo* Calx antimonii nitrata. Ed.
    Antimonium calcinatum. Lond. *Vulgo Antimonium diaphoret.*
    Antim. calcareo-phosphoratum, sive pulvis antimonialis. Ed.
    Pulvis antimonialis. Lond.
V. By the action of acids.
    Antim. vitriolat. Klaunig.
    Antim. cathartic. Wilson.
    Antimonium muriatum, *vulgo* Butyrum antim. Ed.
    Antimonium muriatum. Lond.
    Pulvis algarothi sive *Mercurius Vitæ.*
    Bezoardicum minerale.
    Antimonium tartarisatum, *vulgo* Tartarus emeticus. Ed.
    Antimonium tartarisatum. Lond.
    Vinum antimonii tartarisati. Ed. et Lond.
    Vinum antimonii. Lond.

From the Regulus.

This metal, separated from the sulphur by different processes, is called *Regulus antimonii simplex, Regulus martialis, Regulus jovialis,* &c. From it were prepared,

I. By the action of heat and air,
    Flores argentei, sive nix antimonii.
II. By the action of nitre,
    Cerussa antimonii.
    Stomachicum Poterii.
    Antihecticum Poterii.
    Cardiacum Poterii.

PREPARATIONS which have their name from ANTIMONY, but scarcely contain any of it.

    Cinnabaris antimonii.
    Tinctura antimonii.

To this table of Dr. Black's, which is left unaltered, I shall add another, of the officinal preparations, not taken from the mode of preparation, but from the nature of the product.

ANTIMONY is exhibited,

I. In its metalic state,
  Combined with sulphur.
    Sulphuretum antimonii. *E. D.* Antimonium. *L.*
    ——————————— præparatum. *E. L. D.*
II. Oxidized.
  a. Protoxide,
    Combined with sulphur,
      1. Oxidum antimonii cum sulphure vitrificatum. *E.*
        Antimonium vitrificatum. *L.*
        Melted with wax,
        Oxidum antimonii vitrificatum cum cera. *E.*
      2. Oxidum antimonii cum sulphure per nitratem potassæ. *E.*
        Crocus antimonii. *L.*
      3. Sulphuretum antimonii præcipitatum. *E.* Sulphur antimonii præcipitatum. *L.*
      4. Sulphur antimoniatum fuscum. *D.*
  b. Protoxide combined with muriatic acid,
      1. Murias antimonii. *E.* Antimonium muriatum. *L.*
      2. Oxidum antimonii nitro-muriaticum. *D.*
  c. Protoxide combined with tartaric acid and potass,
      1. Tartris antimonii. *E.* Antimonium tartarisatum. *L.*
        Tartarum antimoniatum, sive emeticum. *D.*
        Dissolved in wine,
      1. Vinum tartritis antimonii. *E.* Vinum antimonii tartarisati. *L.*
      2. Vinum antimonii. *L.*
  d. Protoxide combined with phosphate of lime,
    Oxidum antimonii cum phosphate calcis. *E.*
    Pulvis antimonialis. *L. D.*
  e. Peroxide,
      Antimonium calcinatum. *L.*

These are the principal preparations of antimony. In estimating their comparative value, we may attend to the following observations. All the metallic preparations are uncertain, as it entirely depends on the state of the stomach, whether they act at all, or operate with dangerous violence. The sulphuret is exposed, though in a less degree, to the same objections.

The preparations in which antimony is in the state of peroxide, are perfectly insoluble in any vegetable or animal acid, and are also found to be inert when taken into the stomach.

The remaining preparations of antimony, or those in which it is in the state of protoxide, are readily soluble in the juices of the stomach, and act in very minute doses. Of its saline preparations, only those can be used internally which contain a vegetable acid; for its soluble combinations with the simple acids are very acrid and corrosive. In general, the surest and best preparations of antimony are those which contain a known quantity of the metal in its state of protoxide.

The general effects of antimonials are, in small doses, diaphoresis, nausea; in large doses, full vomiting and purging. Some allege that antimonials are of most use in fevers when they do not produce any sensible evacuation, as is said to be the case sometimes with James's powder. They therefore prefer it in typhus, and emetic tartar in synochus, in which there is the appearance at first of more activity in the system, and more apparent cause for evacuation.

APIUM PETROSELINUM. *Ed.*

Willd. g. 63, *sp.* 1. *Pentandria Digynia.*—Nat. Ord. *Umbellatæ.*
Petroselinum. Lond.
Parsley.

Off.—Radix, semen. The root and seed.

Parsley is a biennial plant, and a native of the South of Europe. It is very generally cultivated in this country for culinary purposes. The seeds have an aromatic flavour, and are occasionally made use of as carminatives. The taste of the root is somewhat sweetish, with a light degree of warmth and aromatic flavour, and it possesses gentle diuretic properties.

AQUA.

Water.

Water does not enter the list of materia medica of any of the colleges, but it is so important an agent, both in the cure of diseases, and in the practice of pharmacy, that a brief account of its varieties and properties can scarcely be considered as superfluous.

The chemical properties of water have been already enumerated. The purest natural water is snow, or rain water, collected in the open fields; that which falls in towns, or is collected from the roofs of houses, is contaminated with soot, animal effluvia, and other impurities, although after it has rained for some time, the quantity of these diminishes so much, that Morveau says that it may be rendered almost perfectly pure by means of a little barytic water, and exposure to the atmosphere. Rain water, after it falls, either remains on the surface of the earth, or penetrates through it until it meet with some impenetrable obstruction to its progress, when it bursts out at some lower part, forming a spring or well. The water on the surface of the earth, either descends along its declivities in streams, which, gradually wearing channels for themselves, combine to form rivers, which at last reach the sea, or remain stagnant in cavities of considerable depth, forming lakes or ponds, or on nearly level ground forming marshes.

The varieties of spring water are exceedingly numerous; but they may be divided into the soft, which are sufficiently pure to dissolve soap, and to answer the purposes of pure water in general; the hard, which contain earthy salts and decompose soap, and are unfit for many purposes, both in domestic economy and in manufactures; and the saline, which are strongly impregnated with soluble salts. When spring waters possess any peculiar character they are called mineral waters. River water is in general soft, as it is formed of spring water, which by exposure becomes more pure; and running surface water, which although turbid, from particles of clay suspended in it, is otherwise very pure. Lake water is similar to river water. The water of marshes, on the contrary, is exceedingly impure, and often highly fetid, from the great proportion of animal and vegetable matters which is constantly decaying in them.

Mineral waters derive their peculiarity of character, in general, either from containing carbonic acid, or soda, not neutralized, sulphuretted hydrogen, purging salts, earthy salts, or iron; or from their temperature exceeding in a greater or less degree that of the atmosphere. The following are the most celebrated:

a. Warm springs.—Bath, Bristol, Buxton, Matlock, in England. Barege, Vichy, &c. in France. Aix-la-Chapelle, Borset, Baden, Carlsbad, and Toeplitz in Germany; and Pisa, Lucca, Baia, and many others, in Italy.
b. Carbonated springs.—Pyrmont, Seltzer, Spa, Cheltenham, Scarborough.
c. Alkaline.—Carlsbad, Aix-la-Chapelle, Barege, Toeplitz.
d. Sulphureous.—Enghien, Lu, Aix-la-Chapelle, Kilburn, Harrowgate, Moffat, and many in Italy.
e. Purging.—Sea water, Lemington Priors, Harrowgate, Lu, Carlsbad, Moffat, Toeplitz, Epsom, Sedlitz, Kilburn, and all brackish waters.
f. Calcareous.—Matlock, Buxton, and all hard waters.
g. Chalybeate.—Hartfell, Denmark, Cheltenham, Pyrmont, Spa, Tunbridge, Bath, Scarborough, Vichy, Carlsbad, Lemington Priors.

			Gases. Cubic Inches			Azote.	Carbonates of				Muriates of			Sulphates of			Iron.	Silica.	Alumin.	Resin.	
			Air.	Carb. acid.	Sulph. hyd.		Soda.	Lime.	Magn.	Iron.	Soda.	Lime.	Mag.	Soda.	Lime.	Mag.					
Dr. Black.	Geyzer.	1000	—	—	—	—	0.95[a]	—	—	—	2.46	—	—	1.46	—	—	—	5.4	0.18	—	[a] Pure soda.
Klaproth.	Carlsbad.	25320	—	50.	—	—	38.5	12.5	—	0.125	32.5	—	—	56.75	—	—	—	2.25	—	—	
Hassenfratz.	Pouges.	26265.6	—	47.8	—	—	29.8	35.25	3.45	—	0.3	—	—	—	—	—	—	0.6[a]	1.0	—	[a] and iron.
Bergmann.	Selzer.	8949	0.218	13.07	—	—	5.23	78.38	6.32	—	13.75	—	—	—	6.	—	—	—	—	—	
British coast	Sea water.	Pint.	—	—	—	—	—	—	—	—	186.5	—	51.	—	—	—	—	—	—	—	
Hassenfratz.	St. Parize.	16627	—	26.28	x	—	—	21.4	1	—	1.375	—	—	—	24.1	—	—	—	—	—	[a] unascertained.
Dr. Pearson.	Buxton.	58309	—	—	—	2	—	10.5	—	—	1.5	—	—	—	2.5	—	—	—	—	—	[a] & sulphate of do.
– Falconer.	Bath.	58309	—	8.	—	8	—	—	—	—	40[a]	—	—	—	34.5[b]	—	—	—	—	—	[b] and carbonate of
– Carrick.	Br'stol.	58309	3	30.	—	—	—	13.5	—	—	4	—	7.25	11.25	11.25	—	—	—	—	—	do. and irou.
Mr. Bliss.	Kilburn.	58309	5.5	18.	—	—	—	8.04	10.75	—	18	14.75	33	117.5	42	265	—	—	—	—	
Bergmann.	Seidschutz.	3977.	0.136	0.8712	—	—	—	0.98	2.7225	—	—	—	4.74	—	5.336	187.1	—	—	—	4[a]	[a] extractive and in-
Mr. Lucas.	Epsom.	58309	—	—	—	—	—	—	—	—	—	—	—	—	60	300	—	—	—	—	soluble.
Dr. Garnet.	Moffat.	58309	—	5.	10	4	—	—	—	—	36	—	—	—	—	—	—	—	—	—	
– Garnet.	Harrowgate.	58309	—	8.	19	7	—	18.5	5.5	—	615.5	13	91	—	—	10.5[a]	—	—	—	—	[a] sulphuretted.
Brezé.	Lu.	36864	—	—	—	—	—	10.22	—	—	36.74	9.25	—	—	14.3	—	—	0.23	—	3.04[a]	[a] sulphur.
Fourcroy.	Enghien.	92160	—	27.2	10.	—	—	21.	1.33	—	0.024	—	8.	—	33.3	15.8	—	—	—	—	
Fergmann.	Aix la Chap.	Pint.	—	—	13.068	—	15.246	5.98	—	6.216	—	—	—	—	—	—	—	—	—	1.7424[a]	[a] sulphur.
Bergmann.	Caroline.	Pint.	—	—	13.068	—	14.81	5.23	—	—	—	—	—	52.272	—	—	—	—	—	1.7424[a]	[a] sulphur.
Dr. Garnet.	Hartfell.	58309	—	5.	—	—	—	—	—	15	—	—	—	—	—	—	84	—	12	—	[a] sulphate.
– Marcet.	Brighton.	Pint.	2.5	—	—	—	—	—	—	—	1.58	—	0.75	—	4.09	—	1.5	0.14	—	—	
– Lambe.	Lem. Priors.	5816	—	0.5	—	3.5	—	—	—	0.75	430	—	11.5	15.2	11.2	—	—	—	—	—	
– Babington.	Tunbridge.	58309	1.4	10.6	—	4	—	—	—	1.	0.5	—	2.25	—	1.25	—	—	—	—	—	
Mr. Bliss.	Hampstead.	58309	909	10.1	—	—	—	—	—	1.5	1.	—	1.75	—	2.12	—	—	0.38	—	—	
Julin.	Uhleaborg.	12250	—	10.	—	—	—	19	—	1.2	5.7[a]	—	—	—	0.8	—	—	1.7	—	—	[a] and one of muriate of potass.
Bergmann.	Pyrmont.	8950	—	19.602	—	—	4.35	9.801	—	0.708	1.525	—	—	—	8.385	5.445	—	—	—	—	
Jahn.	Toeplitz.	225100	—	132.5	28.5	—	—	16.5	—	3.25	—	61.3	—	—	—	—	—	15.4	—	—	
Gren.	Egra.	12292	—	44.	—	—	47	7.5	—	4.	15.5	—	—	275	—	—	—	—	—	—	
Bergmann.	Spa.	8932	—	9.8	—	—	1.85	1.85	4.35	0.708	0.218	—	—	—	—	—	—	—	—	—	
Do. [Chap.	Medvi.	Pint.	—	6.534	8.712	—	—	—	—	0.926	—	0.109	—	—	—	—	—	—	—	—	
Fothergill.	Cheltenh^{m}.	58309	—	40.368	15.184	—	—	—	—	5.	5.	—	25[a]	480[b]	40	—	—	—	—	—	[a] and carbonated.
Schneisser.	Kilburn.	13824	—	8.4	3.6	—	—	2.4	1.25	0.313	6	0.6	12.8	28.2	13.	91	—	—	—	6	[b] and of magnesia.
Dr. Marcet.	Dead sea.	1000	—	—	—	—	—	—	—	—	106.76	37.92	101.	—	0.54	—	—	—	—	—	

Medical use.—Water is an essenial constituent in the organization of all living bodies; and as it is continually expended during the process of life, that waste must be also continually supplied, and this supply is of such importance that it is not left to reason or to chance, but forms the object of an imperious appetite. When taken into the stomach, water acts by its temperature, its bulk, and the quantity absorbed by the lacteals. Water about 60° gives no sensation of heat or cold; between 60° and 45° it gives a sensation of cold, followed by a glow and increase of appetite and vigour; below 45° the sensation of cold is permanent and unpleasant, and it acts as an astringent and sedative; above 60° it excites nausea and vomiting, probably by partially relaxing the fibres of the stomach, for when mixed with stimulating substances it has not these effects. In the stomach and in the intestines it acts also by its bulk, producing the effects arising from the distension of these organs; and as the intestinal gases consist of hydrogen gas, either pure or carbonated, or sulphuretted, or phosphuretted, it is probably in part decomposed in them. It likewise dilutes the contents of the stomach and intestines, thus often diminishing their acrimony. It is absorbed by the lacteals, dilutes the chyle and the blood, increases their fluidity, lessens their acrimony, and produces *plthora ad molem.* Its effects in producing plethora and fluidity are however very transitory, as it at the same time increases the secretion by the skin and kidneys. Indeed, the effects of sudorifics and diuretics depend, in a great measure, on the quantity of water taken along with them.

Mineral waters have also a specific action depending on the foreign substances which they contain. It is however necessary to remark, that their effects are in general much greater than might be expected from the strength of their impregnations, owing, probably, to the very circumstance of their great dilution, by which every particle is presented in a state of activity, while the lacteals admit them more readily than they would in a less diluted state.

Carbonic acid gas gives to the waters which are strongly impregnated with it a sparkling appearance, and an agreeable degree of pungency. In its effects on the body it is decidedly stimulant, and even capable of producing a certain degree of transient intoxication. It is of great service in bilious complaints, atony of the stomach, nausea, and vomiting, and in all fevers of the typhoid type.

Alkaline waters produce also a tonic effect on the stomach, but they are less grateful. They are particularly serviceable in morbid acidity of the stomach, and in diseases of the urinary organs.

Sulphureous waters are chiefly used in cutaneous and glandular diseases. Their effects are stimulant and heating, and they operate by the skin or bowels.

Purging waters derive their effects from the neutral salts they contain, especially the muriates of soda, lime, and magnesia, and the sulphates of soda and magnesia. They are much more frequently used for a length of time to keep the bowels open by exciting the natural action, than to produce full purging. Used in this way, instead of debilitating the patient, they increase his appetite, health, and strength.

Chalybeate waters are used as tonics. They stimulate considerably, and increase the circulation; but as they also generally contain neutral salts, they act as gentle laxatives. They are used in all cases of debility, cachexia, chlorosis, fluor albus, amenorrhœa, and in general in what are called nervous diseases.

The external use of water depends almost entirely on its temperature, which may be

1. Greater than that of the body, or above 97° F. The hot bath.
2. Below the temperature of the body.
   a. From 97 to 85, the warm bath.
   b. From 85 to 65, the tepid bath.
   c. From 65 to 32, the cold bath.

The hot bath is decidedly stimulant in its action. It renders the pulse frequent, the veins turgid, the skin red, the face flushed, the respiration quick, increases animal heat, and produces sweat. If the temperature be very high, the face becomes bathed in sweat, the arteries at the neck and temples beat with violence, anxiety and a sense of suffocation are induced, and if persisted in, vertigo, throbbing in the head, and apoplexy, are the consequences. It is very rarely employed in medicine, except where there are hot springs, as at Baden in Switzerland. The Russians, and some other nations, use the hot bath as an article of luxury.

The effects of the affusion of hot water have not been ascertained, and it is probable that when the heat is not so great as to destroy the organization of the skin, the very transient application of the water would be more than counteracted by the subsequent evaporation.

With regard to the action arising from their temperature, all baths below 97° differ only in degree, as they all ultimately abstract caloric from the surface, but with a force inversely as their temperature.

The warm bath excites the sensation of warmth, partly because our sensations are merely relative, and partly because its temperature, though less than that of the internal parts of the body, is actually greater than that of the extremities, which are the chief organs of touch. But as water is a much better conductor of caloric than air, and especially than confined air, as much caloric is abstracted from the body by water, which is only a few degrees lower than the internal temperature of the body, as by air of a much lower temperature. The warm bath diminishes the frequency of the pulse, especially when it has been previously greater than natural, and this effect is always in proportion to the time of immersion. It also renders the respiration slower, and lessens the temperature of the body, relaxes the muscular fibre, increases the bulk of the fluids by absorption, removes impurities from the surface, promotes the desquamation and renewal of the cuticle, and softens the nails and indurations of the skin.

The stimulant power of the warm bath is therefore very inconsiderable, and its employment in disease will be chiefly indicated by preternatural heat of the surface and frequency of the pulse, rigidity of the muscular fibre, and morbid affections of the skin. It has accordingly been found serviceable in many cases of pyrexia, both febrile and exanthematous, in many spasmodic diseases, and in most of the impetigines. It is contra-indicated by difficulty of breathing, and internal organic affections, and should not be used when the stomach is full.

The affusion of warm water very generally produces a considerable diminution of heat, a diminished frequency of pulse and respiration, and a tendency to repose and sleep; but its effects are not very permanent, and its stimulus is weak. It is recommended in febrile diseases depending on the stimulus of preternatural heat, and in those attended with laborious respiration, and in the paroxysms of hectic fever.

As the tepid bath and affusion produce effects intermediate between those of warm and cold water, it is unnecessary to enumerate them.

The cold bath produces the sensation of cold, which gradually ceases, and is succeeded by numbness. It excites tremors in the skin, and shivering. The skin becomes pale, contracted, and acquires the appearance termed *cutis anserina*. The fluids are diminished in volume, the solids are contracted, the caliber of the vessels is lessened, and therefore numbness and paleness are induced, and the visible cutaneous veins become smaller. There is a sense of drowsiness and inactivity, the joints become rigid and inflexible, and the limbs are affected with pains and spasmodic contractions. The respiration is rendered quick and irregular, the pulse slow, firm, regular, and small; the internal heat is at first diminished, but gradually and irregularly returns nearly to its natural standard; the extremities, however, continue cold and numb, or swollen and livid; the perspiration is suppressed, and the discharge of urine is rendered more frequent and copious. If the cold be excessive on its application, long-continued violent shiverings are induced, the pulse ceases at the wrist, the motion of the heart becomes feeble and languid, there is a sensation of coldness and faintness at the stomach, and a rapid diminution of animal heat; and at last, delirium, torpor, and death, are the consequences. If the application of the cold bath be not carried to an excessive length, on emerging from the water, the whole body is pervaded by an agreeable sensation of warmth, and the patient feels refreshed and invigorated.

The primary action of the cold bath is stimulant, and the degree of this action is in proportion to the lowness of its temperature. This opinion is indeed directly opposite to a theory of cold which has been advanced with the confidence of demonstration. "Heat is a stimulus; cold is the abstraction of heat; "therefore cold is the abstraction of stimulus, or is a sedative." To this we might oppose another theory, equally syllogistic, and nearer the truth: free caloric is a stimulus; cold is the sensation excited by the passage of free caloric out of the body; therefore cold is a stimulus. But, in fact, the action of cold is by no means so simple. It is complicated, and varies according to its intensity, duration, and the state of the system to which it is applied. It acts at first as a stimulant, in exciting sensation; then as a tonic, in condensing the living fibre; and, lastly, however paradoxical it may appear, as a sedative, by preventing that distribution of blood in the minute and ultimate vessels, which is necessary for the existence of sensibility and irritability, and by the abstraction of the stimulus of heat.

The cold bath may be therefore so managed as to procure any of these effects by regulating the length of time for which it is applied.

Cold affusion, or the pouring of cold water over the body, is a very convenient way of applying the cold bath in many cases. In this way cold is very suddenly applied to the surface, its operation is instantaneous and momentary, but may be continued by repeated affusions for any length of time, and so as to produce its extreme effects. Where the effects of cold affusion may be thought too severe, spunging the body with cold water, or water and vinegar, may be substituted.

The application of cold may be employed in fevers and febrile paroxysms, when the heat is steadily above the natural standard, and in many diseases arising from relaxation and debility. It is contra-indicated when the heat of the body is below 97°, when there is any notable perspiration from the surface, and when there is general plethora. Irritable habits should be defended from the violence of its action, by covering the body with flannel.

In yellow fever, especially in those cases in which the heat of the skin is excessive, it is particularly useful, and ought to be long continued. In phrenitis, and other local inflammations, it promises to be of advantage. In gout its effects are doubtful, being in some instances salutary, in others destructive. A criterion, to enable us to determine when it ought or ought not to be resorted to in this disease, is much wanted. In inflammatory rheumatism and rheumatic gout it is decidedly useful. It is of advantage in all the hæmorrhagies and exanthemata; in tetanus, colic, cholera, hysteria, mania, ischuria, and in burns; and in general in all those local diseases in which solutions of acetite of lead, of muriate of ammonia, &c. are usually employed; for the good effects of these depend almost entirely on their diminished temperature.

Pharm. Prep.

Aqua distillata. *E. L. D.*

ARBUTUS UVA URSI. *Ed.*

Willd. g. 871, *sp.* 7. Smith, *g.* 203, *sp.* 3.—*Decandria Monogynia.*—Nat. ord. *Bicornes.*

Uva Ursi. Lond. Dub.

Whortleberry. Red-berried trailing arbutus.

Off.—Folium. *Ed.* Folia. *Lond. Dub.*

This is a very small evergreen shrub. The leaves are oval, not toothed, and their under surface is smooth and pale green. It grows wild in the woods, and on sand hills in Scotland, and in almost every country in Europe. The *green* leaves alone, Dr. Bourne says, should be selected and picked from the twigs, and dried by a moderate exposure to heat. The powder, when properly prepared, is of a light brown colour, with a shade of greenish-yellow, has nearly the smell of good grass hay, as cut from the rick, and to the taste is at first smartly astringent and bitterish, which sensations gradually soften into a liquorice flavour. Digested in alcohol they give out a green tincture, which is rendered turbid by water, and when filtered, passes transparent and yellow, while a green resin remains on the filter. They are powerfully astringent, approaching, in the deepness of the colour which they give to red sulphate of iron, more nearly to nut-galls than any substance I have tried. Indeed, in some parts of Russia they are used for tanning.

Medical use.—The medical effects of this medicine depend entirely on its astringent and tonic powers. It is therefore used in various fluxes arising from debility, menorrhagia, fluor albus, cystirrhœa, diabetes, enuresis, diarrhœa, dysentery, &c. It has been strongly recommended in phthisical complaints by Dr. Bourne, and in diseases of the urinary organs by De Haen, particularly in ulcerations of the kidneys and bladder. It certainly alleviates the dyspeptic symptoms accompanying nephritic complaints. It is commonly given in the form of powder, in doses of from 20 to 60 grains three or four times a-day.

ARCTIUM LAPPA. *Ed.*

Willd. g. 1429, *sp.* 1. *Smith. g.* 352, *sp.* 1. *Syngenesia Polygamia Æqualis.*—Nat. ord. *Compositæ Capitatæ.*
Bardana. Lond. Dub.
Burdock. Clit-bur.

Off.—Radix, the root.

This is a perennial plant, which grows wild in uncultivated places. The seeds have a bitterish subacrid taste: they are recommended as very efficacious diuretics, given either in the form of emulsion, or in powder, to the quantity of a drachm. The roots taste sweetish, with a light austerity and bitterishness: they are esteemed aperient, diuretic, and sudorific, and are said to act without irritation, so as to be safely ventured upon in acute disorders. Decoctions of them have of late been used in rheumatic, gouty, venereal, and other disorders; and are preferred by some to those of sarsaparilla.

ARGENTUM. *Ed. Lond.*

Argentum in laminas extensum. Dub.
Silver. Silver leaf.

The chemical and physical properties of silver have been already enumerated.

Silver is found,

I. In its metallic state:
    1. Pure.
    2. Alloyed with gold. Auriferous silver ore.
    3. ——— antimony.
    4. ——— iron and arsenic.
    5. ——— bismuth.
II. Combined with sulphur:
    1. Sulphuretted silver. Vitreous silver ore.
    2. ——— with antimony, iron, arsenic, and copper. Black or brittle silver ore.
    3. ——— with copper and antimony. Black silver ore.
    4. ——— with lead and antimony. White silver ore.
III. Oxidized:
    1. Combined with carbonic acid and antimony.
    2. ——— muriatic acid.
        a. Corneous silver ore.
        b. Earthy silver ore.
        c. Sooty silver ore.

3. Combined with sulphur and oxide of antimony. Red silver ore.
4. ——————— molybdic acid.

Officinal Preparation.

Nitras argenti. *E. L. D.*

ARISTOLOCHIA SERPENTARIA. *Ed.*

Gynandria Hexandria.—Murray, g. 1022, *sp.* 10.—Nat. ord. *Sarmentosæ.*

Serpentaria Virginiana. Lond. Dub.

Virginian Snake-root.

Off.—Radix, the root.

This is a small, light, bushy root, consisting of a number of strings or fibres matted together, issuing from one common head; of a brownish colour on the outside, and paler or yellowish within. It has an aromatic smell, like that of valerian, but more agreeable; and a warm, bitterish, pungent taste, very much resembling that of camphor. I find that, treated with alcohol, it affords a bright green tincture, which is rendered turbid by water; by filtration a small portion of a green matter is separated, but its transparency is not restored. It neither precipitates tannin or gelatin, nor affects the salts of iron or tincture of turnsole. When the diluted tincture is distilled, the spirit and tincture pass over milky, strongly impregnated with its peculiar flavour.

Medical use.—Its virtues are principally owing to the essential oil with which it abounds. Its general action is heating and stimulant; its particular effects, to promote the discharge by the skin and urine. In its effects it therefore coincides with camphor, but seems to be a more permanent stimulus.

It is recommended,

1. In intermittent fevers, especially when the paroxyms do not terminate by sweating, and to assist the action of Peruvian bark in obstinate cases.
2. In typhus, and in putrid diseases, to support the *vis vitæ*, and to excite gentle diaphoresis.
3. In exanthematous diseases, when the fever is of the typhoid type, to support the action of the skin, and keep out the eruption.
4. In gangrene. Externally it is used as a gargle in the putrid sore throat.

It is exhibited,

1. In powder, which is the best form, in doses of twenty or thirty grains.

2. In infusion with wine or water. By decoction its powers are entirely destroyed.

It is often combined with Peruvian bark, or with camphor.

Officinal Preparations.

Tinctura Aristolochiæ serpentariæ. *E. L. D.*
————Cinchonæ composita. *L. D.*
Electuarium opiatum. *E.*
Cataplasma cumini. *L.*

ARNICA MONTANA. *Ed.*

Willd. g. 1491, *sp.* 1. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ radiatæ.*

Arnica. *Lond. Dub.*
German Leopad's-bane

Off.—Herba, flores, radix. The plant, root, and flowers.

Leopard's-Bane is a very common perennial plant in the alpine parts of Germany, in Sweden, Lapland, and Switzerland. The flowers, which are of a yellow colour, and compound, consisting entirely of tubular florets, are distinguished from similar flowers, with which they are often mixed, from ignorance or fraud, by the common calyx, which is shorter than the florets, and consists entirely of lancet-shaped scales, lying parallel, and close to each other, of a green colour, with purple points. The calyx of the different species of Inula are composed of bristle-shaped scales, reflected at the points, and beset with hairs. The florets of the the genus Hypochæris are strap-shaped.

These flowers have a weak bitterish taste, evidently combined with a degree of acrimony; and when rubbed with the fingers, have a somewhat aromatic smell. Their active constituents are not sufficiently ascertained. They evidently contain a great deal of resin, and some essential oil.

Medical use.—In their effects they are stimulating, and supposed to be discutient. In small doses, and properly administered, they possess very benefiical effects, in raising the pulse, in exciting the action of the whole sanguiferous system, in checking diarrhœas, in promoting expectoration, and, most particularly, in removing paralytic affections of the voluntary muscles; but their use is frequently attended with no sensible operation, except that in some cases of paralysis, the cure is said to be preceded by a peculiar prickling, and by shooting pains in the affected parts. When given improperly, or in too large doses, they excite an insupportable degree of anxiety, shooting and burning pains, and even dangerous hæmorrhagies, vomiting, vertigo, and coma. For these dangerous symptoms, vinegar is said to be the best remedy.

They have been recommended,

1. In paralytic disorders, in chronic rheumatism, in retention of the urine, from paralysis of the bladder, in amaurosis.
2. In intermittent fevers, combined with Peruvian bark.
3. In dysentery and diarrhœa, but in some cases they have had bad effects.
4. In putrid diseases.
5. In typhoid inflammations.
6. To promote the uterine discharge.
7. And in internal pains, and congestions, from bruises. In the countries where they are indigenous, the flowers of the leopard's-bane have long been a popular remedy in these accidents.

They are contraindicated by an inflammatory diathesis, a predisposition to hæmorrhagies, and internal congestions.

They are best exhibited in the form of infusion. One or two scruples may be infused with half a pound of water, and drunk at proper intervals. The flowers should be wrapt up in a piece of linen, as otherwise their down is apt to be diffused in the liquid, and to cause violent irritation of the throat.

Off. Radix, the root.

The dried root of this plant is about the thickness of a small quill, and sends out fibres along on one side. Externally it is rough, and of a red brown colour, internally of a dirty white. Its taste is acrid, and slightly bitter. Neumann extracted from 960 parts 840 watery extract, and 5 alcoholic; and inversely 270 alcoholic, and 540 watery.

Medical use.—It is exhibited in the same manner and circumstances as the flowers, but it is more apt to excite vomiting. In powder its dose is from five to ten grains.

ARSENICUM.

Arsenic.

The general properties of this metal have been already enumerated.

Arsenic is found,

I. In its metallic state:
  1. Alloyed with iron. Native arsenic.
  2. ———— iron and gold.
  3. ———— cobalt.
  4. Combined with iron and sulphur. Arsenical pyrites.
  5. ———— iron, sulphur, and silver. White arsenical pyrites.

II. Oxidized:
  1. Uncombined. White oxide of arsenic. Arsenious acid.

2. Combined with sulphur:
    a. Oxide of arsenic 90, sulphur 10. Orpiment. Yellow sulphuretted arsenic.
    b. Oxide of arsenic 84, sulphur 16. Realgar. Red sulphuretted arsenic.

III. Acidified and combined:
1. With lime.
2. With copper.
3 With iron.
4. With lead.
5. With nickel.
6. With cobalt.

OXIDUM ARSENICI. *Ed.* OXIDUM ALBUM. *Dub.*
Oxide of arsenic. Arsenious acid, Fourcroy.

THIS substance, which was formerly named, improperly, arsenic, is most generally obtained in the process of roasting the ores of cobalt in Saxony. The roasting is performed in a kind of reverberatory furnace, with which a very long chimney is connected, lying in a horizontal direction. The arsenious acid is condensed in it in the form of a loose grey powder, which, by a second sublimation with a little potass, and in a great degree of heat, coalesces into a firm vitreous sublimate, which gradually becomes opaque by exposure to the air. In this state it is the white arsenic of commerce, or, as it should be termed, the arsenious acid. For internal use, the lumps of a shining appearance and dazzling whiteness should be chosen; but it is generally offered to sale in the form of powder, which is very often mixed with chalk or gypsum. The fraud is easily detected by exposing it to heat. The arsenious acid is entirely sublimed, and the additions remain behind.

As this substance is one of the most virulent poisons, we shall give a full account of its properties. It is white, compact, brittle, and of a glassy appearance. Its taste is sweetish, but acrid, and slow in manifesting itself. It sublimes entirely when exposed to 283° Fahrenheit. When the operation is performed in close vessels, the arsenious acid assumes a glassy appearance, which it soon loses on exposure to the air. In open vessels it sublimes in dense white fumes, smelling strongly of garlic. If a plate of copper be exposed to the fumes, it is whitened. Arsenious acid is soluble in 80 parts of water at 60°, and in 15 at 212°. This solution has an acrid taste, and reddens vegetable blues. It is also soluble in 80 parts of boiling alcohol. From either solution it may be obtained regularly crystallized in tetrahedrons. From its solutions a grass-green precipitate is separated by a solution of sulphate of iron, or of ammoniaret of iron, a white precipitate by lime-water, and a yellow precipitate by any of the combinations of an alkali with sulphur, or with sulphur and hydrogen. All these precipitates, when exposed to a sufficient temperature, sublime entirely, and emit the smell of garlic. Mixed with a little sulphur, it sublimes of an orange or red colour. When treated with nitric acid, the arsenious acid is converted into arsenic acid. But by far the surest test of the presence of arsenic, is its reduction by carbonaceous substances. With this view, a small quantity of any suspected substance may be mixed with some carbonaceous or fatty or oily matter, and introduced within a tube closed at the bottom, and exposed to a red heat; if arsenic be present in any state, it will be sublimed in the form of brilliant metallic scales. By means of a small tube and a blowpipe, a very small quantity may be detected in this way.

Arsenious acid is used by the dyers, as a flux in glass-making, in docimastic works, and in some glazes. Arsenious sulphurets are much used by painters, but these advantages are not able to compensate for its bad effects. In mines, it causes the destruction of numbers who explore them; being very volatile, it forms a dust, which affects and destroys the lungs, and the unhappy miners, after a languishing life of a few years, all perish sooner or later. The property which it possesses of being soluble in water, increases and facilitates its destructive power; and it ought to be proscribed in commerce, by the strict law which prohibits the sale of poisons to unknown persons. Arsenious acid is every day the instrument by which victims are sacrificed, either by the hand of wickedness or imprudence. It is often mistaken for sugar, and these mistakes are attended with the most dreadful consequences. The symptoms which characterise this poison are, a great constriction of the throat, the teeth set on edge, and the mouth strongly heated, and involuntary spitting, with extreme pains in the stomach, vomiting of glairy and bloody matter, with cold sweats and convulsions.

On dissection, the stomach and bowels are found to be inflamed, gangrenous, and corroded, and the blood is fluid. Soon after death, livid spots appear on the surface of the body, the nails become blue, and often fall off along with the hair, the epidermis separates, and the whole body becomes very speedily putrid. When the quantity is so very small as not to prove fatal, tremors, palsies, and lingering hectics succeed.

Mucilaginous drinks have been long ago given to persons poisoned by arsenic. Milk, fat, oils, and butter, have been successively employed. M. Navier has proposed a more direct counter-poison. He prescribes one drachm of sulphuret of potass to be dissolved in a pint of water, which the patient is directed to drink at several draughts; the sulphur unites to the arsenic, and destroys its causticity and effects. When the first symptoms are alleviated, he advises the use of sulphureous mineral waters. He likewise approves the use of milk, but condemns oils. Vinegar, which dissolves arsenic, has been recommended by M. Sage, but upon what grounds we know not.

According to Hahneman, a solution of soap is the best remedy. One pound of soap may be dissolved in four pounds of water, and a cupful of this solution may be drunk lukewarm every three or four minutes.

Medical use.—Notwithstanding the very violent effects of arsenious acid, it has, however, been employed in the cure of diseases, both as applied externally, and as taken internally.

Externally, it has been chiefly employed in cases of cancer.

Justamond used an ointment composed of four grains of white oxide of arsenic, ten grains of opium, and a drachm of cerate, and spread very thin upon linen. But its action is tedious. He also fumigated cancerous sores with sulphuret of arsenic, with a view to destroy their intolerable fetor, with great success. Le Febure washed cancerous sores frequently, in the course of the day, with a solution of four grains of arsenious acid in two pounds of water. Arnemann recommends an ointment of one drachm of arsenious acid, the same quantity of sulphur, an ounce of distilled vinegar, and an ounce of ointment of white oxide of lead, in cancerous, and obstinate ill-conditioned sores, and in suppurated scrofulous glands. The arsenious acid has even been applied in substance, sprinkled upon the ulcer. But this mode of using it is excessively painful, and extremely dangerous. There have been even fatal effects produced from its absorption.

The principal thing to be attended to in arsenical applications is to diminish their activity to a certain degree. They then cause little irritation or pain, but rather excite a gentle degree of inflammation, which causes the diseased parts to be thrown off, as if they were foreign substances, while they have the peculiar advantage of not extending their operation laterally.

No other escharotic possesses equal powers in cancerous affections; but, unfortunately, its good effects often do not go beyond a certain length; and if in some cases it effects a cure, in others it must be allowed that it does harm. While it has occasioned very considerable pain, it has given the parts no disposition to heal, the progress of the ulceration becoming even more rapid than before.

Internally, it may be exhibited in the form,

1. Of arsenious acid dissolved in distilled water, in the proportion of four grains to a pint. A table spoonful of this solution, mixed with an equal quantity of milk,

and a little syrup of poppies, is directed to be taken every morning fasting, and the frequency of the dose gradually increased until six table spoonfuls be taken daily. M. Le Febure's method of curing cancer.

2. Of arsenite of potass. Sixty-four grains of arsenious acid, with an equal quantity of carbonate of potass, are to be boiled together until the arsenious acid be dissolved, when as much water is to be added as will increase the solution to one pound. Of this, from two to twelve drops may be given once, twice, or oftener, in the course of a day. Dr. Fowler's method of curing intermittent fever.
3. Of arseniate of potass. Mix well together equal quantities of nitrate of potass, and of pure arsenious acid; put them into a retort, and distil it first with a gentle heat, and afterwards with so strong a heat as to redden the bottom of the retort. In this process the nitric acid is partly decomposed, and passes over into the receiver in the state of nitrous acid. The arsenious acid is at the same time converted into arsenic acid, and combines with the potass. The product, which is arseniate of potass, is found in the bottom of the retort, and may be obtained in the form of crystals, of a prismatic figure, by dissolving it in distilled water, filtering the solution through paper, evaporating, and crystallizing. A preparation of M. Macquer's.
4. Arsenious acid, in substance, to the extent of an eighth of a grain for a dose, combined with a little sublimed sulphur, has been said to be exhibited in some very obstinate cases of cutaneous diseases, and with the best effect.
5. Combined with six times its weight of black pepper, it is given by the native physicians in the East Indies for the cure of the Persian fire (syphilis), and a species of elephantiasis, called juzam.

The internal use of arsenic has been lately much extended, in consequence of the observations of Dr. Fowler, Mr. Jenkinson, Dr. Bardsley, Dr. Kellie, Mr. Hill, &c. Before Dr. Fowler wrote, it was indeed in use empirically, for the cure of cancers, and even as a popular remedy, in various countries; as in the East Indies, against cutaneous affections; and in the fens of Hungary and Lincolnshire, against the ague. But Dr. Fowler first, by that inductive method of ascertaining its effects, which he so successfully practised, recommended it to the notice of regular practitioners. He confined himself to the advantages derived from it in periodical diseases; and Mr. Jenkinson has, more recently, extended the use of it to certain painful affections of the bones, cases of "very long standing, attended with great debility, and local affections, not of the muscles and integuments, but of the ends of the bones, cartilages, or ligaments, or of all three together." He thinks it hurtful in recent affections, except where there are regular intermissions, and in the disease described by Dr. Haygarth, under the title of nodosity of the joints. For a complete list of the diseases in which it has been tried, Mr. Hill's paper in the Edinburgh Medical Journal may be consulted.

The great difficulty attending the exhibition of so very active a remedy, is regulating the dose so as to produce the full effect, without carrying it farther than is absolutely necessary. Dr. Kellie has accurately pointed out the precautions to be observed with this view. He always gives arsenic immediately after meals, under the idea that it will be less apt to affect the stomach when full than when empty. "From all I have observed, I have little apprehension of risk in a guarded and judicious use of the arsenical solution. It will always be proper to begin with the smallest doses, in order to ascertain how it agrees with the stomach. Having suited the dose to this, the feeling of swelling and stiffness of the palpebræ and face, heat, soreness, and itching of the tarsi, or tenderness of the mouth, are proofs that the medicine is exerting its specific effects on the constitution; that the dose has been carried to a sufficient length; and that it is time to decrease the dose, and attentively to watch its future effects. On the appearance of erythema, or salivation, it is time to interrupt altogether, for a while, the exhibition of arsenic; if necessary, it may be resumed when these symptoms have vanished. If pain of the stomach, nausea, or vomiting supervene; if the head be affected with pain or vertigo; or should a cough, with any signs of irritation of the pulmanory organs, be observed, the use of arsenic should be totally and for ever abandoned."

Officinal Preparation.

Arsenias kali. *D.*

ARTEMISIA;—*Willd. g.* 1743. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ discoideæ.*

Sp. 8. ARTEMISIA ABROTANUM.
Abrotanum. Lond. Dub.
Southernwood.

Off.—Folia. The leaves.

THIS is a perennial shrub, which grows readily in our gardens, though a native of the south of Europe.

Southernwood has a strong smell, which, to most people, is not disagreeable; it has a pungent, bitter, and somewhat nauseous taste. These qualities are very completely extracted by alcohol, and the tincture is of a beautiful green colour. They are less perfectly extracted by watery liquors, the infusion being of a light brown colour

Med. use.—Southernwood, as well as some other species of the same genus, has been recommended as an anthelmintic; and it has also been sometimes used as stimulant, detergent, and sudorific. Externally, it has been employed in discutient and antiseptic fomentations; and, under the form of lotion and ointment, for cutaneous eruptions, and for preventing the hair from falling off. But it is at present very rarely used in any way.

Officinal Preparation.

Decoctum pro fomento. *L.*

Sp. 42. ARTEMISIA MARITIMA.
Absinthium Maritimum. Lond. Dub.
Sea Wormwood.

Off.—Cacumina. The tops.

THIS species of artemisia is perennial and herbaceous. It grows wild in salt marshes, and in several parts about the sea-coasts. In taste and smell, it is weaker and less unpleasant than the common wormwood, and is now almost rejected from practice.

Officinal Preparations.

Conserva absinthii maritimi. *L.*
Decoctum pro fomento. *L.*

Sp. 26. ARTEMISIA SANTONICA. *Ed.*
Santonicum. Lond. Dub.
Wormseed.

Off.—Cacumen, semen. The tops, the seeds.

ALL the British colleges have given this species as the plant which produces these seeds; but the fact is by no means ascertained. They have been ascribed by different writers to other species of the same genus, the Judaica, the Contra, and the Austriaca, and are even said by Saunders to be the produce of a species of Chenopodium.

The seeds themselves are small, oblong, smooth, and of a greenish or greyish yellow colour. As the whole head is gathered after the seeds are ripe, they are mixed with the scales of the calices and bits of stalks. Their taste is bitter, and somewhat acrid; their smell strong and disagreeable. Those which come from Aleppo are esteemed the best, and those from Barbary the worst. When they have no smell, and a less intensely bitter taste, and are discoloured, and mixed with a longer kind of seed, they are to be rejected. They are also adulterated with the seeds of tansy and wormwood. The latter are easily known, by having a light yellow colour, and resembling powdered hay more than seeds. Neumann obtained from 480 parts, 213 of alcoholic extract, and 110 watery; and inversely, 260 watery, and 28 alcoholic. It gave a slight flavour to water distilled from it, but no oil.

Med. use.—Wormseed is one of the oldest and most common anthelmintics, especially in the lumbrici of children. On account of their essential oil, they are heating and stimulating.

They are given to children,

1. In substance, to the extent of ten grains, or half a drachm, finely powdered, and strewed on bread and butter; or made into an electuary with honey or treacle; or candied with sugar; or diffused through milk, and taken in the morning, when the stomach is empty.
2. In infusion or decoction; but to these forms their bitterness is a strong objection.

After they have been used for some days, it is customary to give a cathartic, or they are combined, from the beginning, with rhubarb, jalap, calomel, sulphate of iron, or muriate of ammonia.

Sp. 63. ARTEMISIA ABSINTHIUM. *Ed.*
Absinthium vulgare. Lond. Dub.
Common wormwood.

Off.—Folium, cacumina, summitas florens. The herb, leaves, and flowering heads.

THIS perennial herb grows by the road-sides, and on rubbish, in many parts of Britain; and about London it is cultivated for medical use. Its smell is strong and disagreeable; its taste intensely bitter. Its active constituents are bitter extractive and essential oil. It is used in stomach complaints, and is of great service to hypochondrists. It is also employed in intermittent fevers, in cachectic and hydropic affections, in jaundice, and against worms. Many persons cannot suffer the disagreeable smell of wormwood, which is apt to occasion headach; but it may be freed from it in a great measure by decoction. The extract is a pure and simple bitter. The essential oil is of a dark green colour, and contains the whole flavour of the plant. It is stimulating, and is supposed to be a powerful antispasmodic and anthelmintic. Wormwood was formerly much used for the preparation of medicated wine and ales.

ARUM MACULATUM.

Gynandria Polyandria. Murray, g. 1028, *sp.* 13. *Monœcia. Polyandria. Smith, g.* 402, *sp.* 1.—Nat. ord. *Piperitæ.*

Arum. Lond. Dub.

Wake-robin.

Off.—Radix recens. The recent root.

This is a perennial solid bulbous-rooted plant, which grows wild in shady situations, and by the sides of banks, in many parts of Britain. The root is knotty, roundish, and white. When collected in spring, before the leaves shoot, or in autumn, after flowering, it contains a very acrid milky juice. Applied to the tongue, it causes a burning heat, which lasts for many hours, and excites considerable thirst. These disagreeable symptoms may be relieved by butter-milk or oily fluids. Rubbed between the fingers, it blisters and excoriates them; it is therefore a corrosive vegetable poison. By drying, it loses the greatest part of its acrimony, and becomes simply amylaceous. It is also rendered perfectly mild by frequent washing with water. It does not rise in distillation, either with alcohol or with water, and is not contained in its extract, although the root is thereby deprived of it. Neumann obtained from 480 of the dry root, 20 of alchoholic extract, and about 180 watery. The former had some slight pungency, the latter none. Its acrimony is therefore easily destructible; and as it does not arise from the presence of an essential oil, it depends upon a vegetable principle, different from all others, and not well understood.

Medical use.—In the recent root, the degree of acrimony is so very uncertain, and often so excessive, that its effects, as an internal remedy, cannot be depended on. The dried root is perfectly inert; but the roots may be kept fresh for a year, by burying them in a cellar in sand. It is given in cachectic cases, supposed to arise from an accumulation of phlegm, and in some rheumatic affections, in the dose of ten or fifteen grains, three times a-day, in the form of a conserve or bolus.

Officinal Preparation.

Conserva Ari. *L.*

ASARUM EUROPÆUM. *Ed.*

Willd. g. 925, *sp.* 1. *Smith, g.* 222, *sp* 1. *Dodecandria Monogynia.*—Nat. ord. *Sarmentaceæ.*

Asarum. Lond. Dub.

Asarabacca.

Off.—Folium. The leaves.

This perennial plant is a native of some places of England, although the dried roots are generally brought from the Levant. It grows in moist and shady situations. It produces only two leaves, which are uniformand very obtuse. The root is fibrous, of a grey-brown colour externally, but white within. Both the roots and leaves have a nauseous, bitter, acrimonious, hot taste; their smell is strong, and not very disagreeable.

In its analysis, it is said by Neumann to agree with ipecacuanha, but it seems to contain, besides its odorous principle, which is probably camphor, a portion of the same acrid principle which has been noticed when speaking of arum. Upon this its virtues depend; and as this principle is volatile, we find accordingly that asarabacca loses much of its activity by decoction and long keeping.

Med. use.—Given in substance from half a drachm to a drachm, it evacuates powerfully both upwards and downwards. It is said, that alcoholic tinctures possess both the emetic and cathartic virtues of the plant: that the extract obtained by inspissating these tinctures acts only by vomiting, and with great mildness: that an infusion in water proves cathartic, rarely emetic: that aqueous decoctions made by long boiling, and the watery extract, have no purgative or emetic quality, but prove good diaphoretics, diuretics, and emmenagogues.

We principally use this plant as a sternutatory. The root of asarum is perhaps the strongest of all the vegetable errhines, white hellebore itself not excepted. Snuffed up the nose, in the quantity of a grain or two, it occasions a copious evacuation of mucus, and ptyalism. The leaves are considerably milder, and may be used to the quantity of three, four, or five grains. Geoffroy relates, that after snuffing up a dose of this errhine at night, he has frequently observed the discharge from the nose to continue for three days together; and that he has known a paralysis of the mouth and tongue cured by one dose. He recommends this medicine in stubborn disorders of the head, proceeding from viscid tenacious matter, in palsies, and in soporific distempers.

Officinal Preparation.

Pulvis Asari compositus. *E. L. D.*

ASTRAGALUS TRAGACANTHA. *Ed.*

Willd. g. 1379, *sp. Diadelphia Decandria.*—Nat. ord. *Papilonaceæ.*

Gummi Tragacantha. Lond. Dub.

Tragacanth.

Off.—Gummi. Gum Tragacanth.

Gum Tragacanth is the produce of a very thorny shrub, which grows on the island of Candia, and other places in the Levant.

About the end of June a fluid exudes from the stem and larger branches, which dries in the sun, and is collected by the shepherds on Mount Ida, from whence it is sent to Europe, under the title of Tragacanth.

It consists of whitish semi-transparent vermiform pieces, scarcely a line in thickness, without taste or smell.

There is also a dirty yellow, or brownish kind, which is not fit for medical purposes.

Tragacanth is difficultly pulverizable, unless when thoroughly dried, and the mortar heated, or in frost. According to Neuman, it gives nothing over in distillation, either to water or alcohol: alcohol dissolves only about 10 parts of 480, and water the whole. Lewis, however, more accurately observes, that it cannot be properly said to be dissolved; for, put into water, it absorbs a large proportion of that fluid, increasing immensely in volume, and forming with it a soft, but not fluid mucilage; and although it is easily diffused through a larger proportion of water, after standing a day or two, the mucilage subsides again, the supernatant fluid retaining little of the gum.

Besides these remarkable differences from gum-arabic in regard to brittleness, insolubility, and the quantity of water which it thickens, I find that tragacanth is not precipitated by silicized potass, and is precipitated by sulphate of copper and acetate of lead.

In pharmacy it is employed for forming powders into troches, and rendering tough cohesive substances, such as colocynth, pulverizable, by beating them with mucilage of tragacanth, and then drying the mass. For electuaries it is improper, as it renders them slimy on keeping.

Officinal Preparations.

Mucilago astragali tragacanthæ. *E. L. D.*
Pulvis tragacanthæ compositus. *L.*
——— cerussæ compositus. *L.*
Trochisci glycyrrhizi. *L.*
——— nitri. *L.*

ATROPA BELLADONNA. *Ed.*

Willd. g. 381, *sp.* 2. *Smith, g.* 100. *sp.* 1.—*Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Belladonna. Dub. Solanum lethale.

Deadly nightshade.

Off.—Folium. The leaf.

The deadly nightshade is a perennial plant, with a herbaceous stem, which is indigenous both in mountainous and woody situations in this country, and often cultivated in gardens. The whole plant is poisonous, and the berries, from their beautiful appearance, have sometimes proved fatal to children. The symptoms excited are, dryness of the mouth, trembling of the tongue, very distressing thirst, difficulty of swallowing, fruitless efforts to vomit, and great anxiety about the præcordia.

Delirium then comes on, with gnashing of the teeth, and convulsions. The pupil remains dilated, and is not sensible even to the stimulus of light. The face becomes tumid, and of a dark-red colour. The jaws are frequently locked. Inflammation attacks the œsophagus, stomach, and intestines, sometimes extending to the mesentery, lungs, and liver, accompanied with violent pains in the abdomen. The stomach is very insensible to stimulus, and the peristaltic motion of the intestines is destroyed. General relaxation, palsy, especially of the lower extremities, convulsions, vertigo, blindness, coma, and death succeed. The body soon putrifies, swells, and becomes marked with livid spots; blood flows from the nose, mouth, and ears, and the stench is insufferable. On dissection the blood is found to be fluid, the intestines are inflated and inflamed, or eroded and gangrenous. The best method of cure is to excite vomiting as soon as possible, by emetics, and tickling the fauces; to evacuate the bowels by purgatives and glysters; and to give, largely, vinegar, honey, milk, and oil. In some children who recovered by this treatment, the delirium was succeeded by a profound sopor, accompanied with subsultus tendinum; the face and hands became pale and cold, and the pulse small, hard, and quick. Their recovery was slow, and the blindness continued a considerable time, but at last went off.

By distillation in the vapour bath, Geoffroy procured from the recent leaves a slightly acrid liquor, and the residuum by destructive distillation yielded carbonate of ammonia.

Medical use.—Yet this virulent poison, under proper management, may become an excellent remedy. Besides its narcotic power, it promotes all the excretions; but its exhibition requires the greatest caution; for it is apt, when continued for any length of time, even in small doses, to cause dryness and tension of the throat and neighbouring parts, vertigo, dimness of sight, and even temporary blindness. When any of these symptoms occur, its use must be suspended for some time, and afterwards resumed in smaller doses.

Deadly nightshade has been exhibited,

1. In several febrile diseases; in obstinate intermittents; and in the plague.
2. In inflammations; the gout.
3. In comatose diseases; in palsy, and loss of speech from apoplexy.
4. In spasmodic diseases; in chorea, epilepsy, chincough, hydrophobia, melancholy, and mania.
5. In cachectic affections; in dropsies, and obstinate jaundice.
6. In local diseases; in amaurosis, ophthalmia, in scirrhus, and cancer.

Deadly nightshade is best exhibited in substance, beginning with a very small dose of the powdered leaves or root, such as the fourth or eighth part of a grain for children, and one grain for adults, to be repeated daily, and gradually increased. In hydrophobia, Munch gave the powdered root every second morning, to the extent of from one to five grains to children, and fourteen or fifteen grains to adults.

The watery infusion is also a powerful remedy. One scruple of the dried leaves are infused in ten ounces of warm water, and straining after cooling. At first two ounces of this may be given daily to adults, and gradually increased, until the tension of the throat shews that it would be imprudent to go farther.

The watery extract is not a judicious preparation.

Externally, the powdered leaves are applied as a narcotic to diminish pain, and to cancerous and ill-conditioned sores. From its effect, in permanently dilating the pupil, Professor Reimarus proposed, and tried with success, the dropping a little of the infusion into the eye, a few hours before performing the extraction for the cataract, with a view of facilitating the operation.

Officinal Preparation.

Succus spissatus atropæ belladromæ. *E.*

AVENA SATIVA. *Ed.*

Willd. g. 142, *sp.* 13. *Triandria Digynia.*—Nat. ord. *Gramina.*

Oats. *Avena. Lond.*

Off.—Semen. The seed.

This is a well known annual plant, which is very generally cultivated in northern countries, and in many places furnishes their principal subsistence. When simply freed from the husks, this grain gets the name of groats, but it is more frequently ground into meal. Groats are made use of in broths. Oat-meal is baked with salt and water into cakes, or, with the same additions, is boiled to form porridge. An infusion of the husks in water, allowed to remain till it becomes acidulous, is boiled down to a jelly, which is called sowins. In all these forms it is nutritious, and easy of digestion.

Med. use.—Gruels or decoctions, either of groats or oatmeal, either plain or acidified, or sweetened, form an excellent drink in febrile diseases, diarrhœa, dysentery, &c. and from their demulcent properties, prove useful in inflammatory disorders, coughs, hoarseness, roughness, and exulcerations of the fauces. Porridge is also frequently applied to phlegmenous swellings, to promote their suppuration.

BITUMEN PETROLEUM. *Ed.*

Petroleum. Lond. Petroleum Barbadense. Dub.

Rock oil. Barbadoes tar.

BITUMEN is now employed as the generic name for several inflammable bodies of different degrees of consistency, from perfect fluidity to that of a brittle but very fusible, solid, and of little specific gravity. They are insoluble in alcohol or in water, combine with essential oils and sulphur, decompose only a small proportion of nitrate of potass by deflagration, and on inflammation leave little or no residuum.

Sp. 1. NAPHTHA. It is nearly as colourless, transparent, and fluid as water.. Specific gravity 0.729 to 0.847, of a highly penetrating, yet not disagreeable smell, somewhat like that of rectified oil of amber, very volatile, and remaining fluid at zero Fahrenheit.

Sp. 2. PETROLEUM. Not so fluid, transparent, or colourless, as the former; smell less pleasant. Specific gravity 0.878.

Sp. 3. MINERAL TAR. Viscid; of a dark colour; smell sometimes strong, but often faint. Specific gravity 1.1.

Sp. 4. MINERAL PITCH.—Maltha. Brittle in cold weather; of a dark colour; opaque. Specific gravity probably 1.07.

Sp. 5. ASPHALTUM. Very brittle; fracture conchoidal; glassy lustre; no smell, unless when melted or heated. Specific gravity 1.07 to 1.65. Fusible and inflammable.

According to Mr. Kirwan and Mr. Hatchett, the first species, by exposure to the air, and gradual decomposition, passes successively through the intermediate states, till at last it is converted into asphaltum. When partially decomposed, the remaining naphtha may be separated by distillation from the superabundant charcoal.

From the different Pharmacopœias having been published before the specific characters were properly ascertained, there is some confusion with regard to the species which is officinal. The London college names the second, while the Edinburgh and Dublin colleges incorrectly give petroleum Barbadense, which belongs to the third species, as a synonym of bitumen petroleum, which is the second. The first species is found abundantly in Persia; but what we receive comes from the Duchy of Modena in Italy. It is very rarely met with in the shops; the second, mixed with a little of the third, and some subtile oil, is usually sent us instead of it.

Medical use.—Petroleum is at present very rarely employed as a medicine; though, if the finer kinds could be procured genuine, they seem to deserve some notice. They are more agreeable than the oil of amber, and milder than that of turpentine, of the virtues of both of which they participate. They are principally recommended by authors for external purposes, against pains and aches, in paralytic complaints, and for preventing chilblains. For these intentions, some of the more common mineral oils have been made use of with good success. An oil extracted from a kind of stone coal has been extolled among the common people, under the name of British oil, for rheumatic pains, &c.; even this is often counterfeited by a small portion of oil of amber added to the common expressed oils.

The Barbadoes tar is found in several of the West-India islands, where it is highly esteemed by the inhabitants as a sudorific, and in disorders of the breast and lungs; though in cases of this kind, attended with inflammation, it is certainly improper; they likewise apply it externally as a discutient, and for preventing paralytic disorders.

Officinal Preparations.

Oleum petrolei. *L.*
Petroleum sulphuratum. *L.*

BOLETUS IGNIARIUS. *Ed.*

Cryptogamia, Fungi.—Nat. ord. *Fungi.*
Agaricus chirurgorum. Off.

Female agaric, or agaric of the oak, called, from its being very easily inflammable, Touchwood, or Spunk.

This fungus is frequently met with on different kinds of trees in Britain, especially the cherry and plumb; and is said to have been sometimes brought into the shops mixed with the true agaric of the larch: from this it is easily distinguished, by its greater weight, dusky colour, and mucilaginous taste void of bitterness. The medullary part of this fungus, beaten soft, and applied externally, has been much celebrated as a styptic; and said to restrain not only veinous, but arterial hæmorrhagies, without the use of ligatures. It does not appear, however, to have any real styptic power, or to act otherwise than dry lint, sponge, or any other soft fungous application. It is best when gathered in August or September.

BOLUS GALLICUS. *Lond.*

French bole.

Boles are earthy aggregates, consisting chiefly of siliceous and argillaceous earths. They are less coherent and more friable than pure clay, more easily diffused through water, and more freely subsiding from it. They feel greasy to the touch, adhere slightly to the tongue, and break down in the mouth, impressing a light sense of astringency. A great variety of these substances were formerly used in medicine, but the French bole alone is now retained in the London Pharmacopœia. It is of a pale red colour, variegated with irregular specks or veins of white and yellow.

These earths have been recommended as astringent, sudorific, and alexipharmic; and they have been used in diarrhœas, dysenteries, hæmorrhagies, and in malignant and pestilential distempers. In intestinal fluxes, and complaints in the first passages, from thin acrimonious humours, they may doubtless be of some use; but the virtues ascribed to them in the other cases appear to have no foundation.

BUBON GALBANUM. *Ed.*

Willd. g. 546, *sp.* 2.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Galbanum. Lond. Dub.

Off.—Gummi-resina. Galbanum, a gum-resin.

This plant is perennial, and grows in Africa. It abounds with a milky juice, which sometimes exudes from the joints of the old plants, but is more frequently obtained by cutting them across some inches above the root. The juice which flows from the wound soon hardens, and is the galbanum which is brought to us from Syria and the Levant.

The best sort of galbanum consists of pale-coloured pieces, about the size of a hazel nut, which, on being broken, appear to be composed of clear white tears, of a bitterish acrid taste, and a strong peculiar smell. But it most commonly occurs in agglutinated masses, composed of yellowish or reddish and clear white tears, which may be easily torn asunder, of the consistence of firm wax, softening by heat, and becoming brittle by cold, and mixed with seeds and leaves. What is mixed with sand, earth, and other impurities, and is of a brown or blackish colour, interspersed with no white grains, of a weak smell, and of a consistence always soft, is bad.

Galbanum is almost entirely soluble in water, but the solution is milky; neither do wine nor vinegar dissolve it perfectly. Alcohol, according to Hagen, has very little action upon it. It is not fusible, but furnishes a considerable proportion of essential oil when distilled with water. Neumann obtained by distillation with water six drachms of oil, besides what remained dissolved in the water. The watery extract amounted to about three ounces. It was somewhat nauseous, but could not have been recognized as a preparation of galbanum. From the same quantity alcohol extracted upwards of nine ounces and a half of a hard brittle insipid inodorous substance (resin?).

Medical use.—Galbanum agrees in virtue with gum ammoniacum; but is generally accounted less proper in asthmas, and more so in hysterical complaints. It is exhibited in the form of pills or emulsion, to the extent of about a drachm. Applied externally, it is supposed to resolve and discuss tumours, and to promote suppuration, *Officinal Preparations.*

Galbanum purificatum. *L.*
Pilulæ galbani compositæ. *L.*
——— assæfœtidæ compositæ. *E.*
Tinctura galbani. *L.*
Emplastrum galbani. *D.*
————— assæfœtidæ. *E.*
————— gummosum. *E.*
————— lithargyri compositum. *L.*

BUTEA FRONDOSA.

Willd. sp. plant. t. 3. p. 917. Diadelphia Monogynia. Roxburgh's Coromandel Plants, vol. i. *p. 22. t. 21. Plaso Rheed. Malab. 6. p. 29. tab. 16. 17. The Maduga of the Telingas.*
Kino. Dub.

Kino.

I HAVE introduced this article, because the Dublin college have quoted it as the source of the kino of the shops, though certainly erroneously; for not only is it well known that the greatest part of the kino of the shops is the product of the eucalyptus resinifera of Botany Bay, but Dr. Roxburgh, whom they quote as their authority, distinctly mentions that the concrete juice of maduga differs from kino. The butea superba, a very large twining shrub, yields a similar juice. To prevent the error from being repeated or propagated, and still more, as the article seems worthy of further examination, I shall quote his own words.

" This is a middle-sized, or rather a large tree, not common in the low lands of this coast, but very common among the mountains; casts its leaves during the cold season, which come out again with the flowers about the months of March or April; seed ripe in June and July.

" From natural fissures and wounds made in the bark of this tree during the hot season, there issues a most beautiful red juice, which soon hardens into a ruby-coloured, brittle, astringent gum; but it soon loses its beautiful colour if exposed to the air. To preserve the colour, the gum must be gathered as soon as it becomes hard, and closely corked up in a bottle. This gum held in the flame of a candle swells, and burns away slowly, without smell or the least flame, into a coal, and then into fine light ashes: held in the mouth, it soon dissolves; it tastes strongly, but simply astringent; heat does not soften it, but rather renders it more brittle. Pure water dissolves it perfectly, and the solution is of a deep, clear, red colour. It is in a great measure soluble in spirits, but the solution is paler, and a little turbid; the watery solution also becomes turbid when spirit is added, and the spirituous more clear by the addition of water:

diluted vitriolic acid renders both solutions turbid; mild caustic (?) vegetable alkali changes the colour of the watery solution to a clear, deep, fiery, blood red; the spirituous it also deepens, but in a less degree; *sal martis* changes the watery solution into a good durable ink."

"These are, I think, proofs that it contains a very small proportion of resin; in which *it differs from the gum resin called kino, or gummi rubrum astringens Gambiense,* which the Edinburgh college has taken into their materia medica. I have used the recent gum in making my experiments, which may make some difference; but as this can be most perfectly dissolved in a watery menstruum, it may prove of use, where a spirituous solution of kino (being the most complete) cannot be properly admitted: consequently it may prove a valuable acquisition."

CALX. *Lond.*
Calx recens usta. *Dub.*
Calx viva. *Ed.*
a. Ex lapide calcareo.
b. Ex testis conchyliorum.
Quicklime recently burnt.

The properties of lime have been already enumerated. It is scarcely found in nature uncombined, but is easily prepared from any of its carbonates, either mineral or animal, by the action of fire, which first expels the water, then destroys any animal matters which may be present, and, lastly, expels the carbonic acid. This process is improperly termed the burning of lime. The product is lime, or, as it is commonly called, quicklime.

If about half its weight of water be poured upon lime, a great increase of temperature takes place, steam is produced, and the lime crumbles down into a dry powder, somewhat increased in weight by the presence of part of the water, which has been solidified by the lime: and to the caloric of fluidity, which is expelled during the conversion of the water into a solid, the great increase of the temperature is owing. Lime in this state is said to be slacked. If more water be poured upon slacked lime, there is no new evolution of caloric; but if the water amount to 700 times the weight of the lime, the lime is completely dissolved. This solution is termed Lime-water.

As lime quickly attracts moisture and carbonic acid from the atmosphere, it should be always recently prepared; and it should be preserved in very close bottles. Lime should not effervesce with acids, and should be entirely soluble in water.

Medical use.—On the living body lime acts as an escharotic, and as such it was formerly applied to ill-conditioned and obstinate sores. Dissolved in water, it is sometimes given internally as a tonic or astringent in scrofula and various fluxes, and formerly it enjoyed considerable reputation as a lithontriptic.

Officinal Preparations.

Aqua calcis. *E. L. D.*
—— potassæ. *E. L. D.*
Aqua ammoniæ. *E. L. D.*
Alcohol ammoniatum. *E.*
Aqua sulphureti ammoniæ. *D.*

CANCER. *Chelæ. Lond.*
The crab. A genus of crustaceous insects.
Sp. CANCER ASTACUS. *Lapilli. Ed.*
The craw-fish. Crabs stones, vulgarly called Crabs eyes.

CRABS stones are generally about the size of peas, or larger; somewhat hemispherical in their shape, and laminated in their texture; of a white colour; but sometimes reddish or bluish.

These concretions are found in the stomach, one on each side, at the time when the crab changes its shell, and renews the inner membrane of the stomach, which commonly happens in the month of August. The stones afterwards gradually disappear, and none are found after the new shell has acquired its full degree of firmness. They therefore seem to furnish the materials for the induration of the new shell. They are brought in great numbers from Poland and Russia, especially from the province of Astracan, where the craw-fish are either bruised with wooden mallets, or laid up in heaps to putrefy, when the flesh is washed away with water, and the stones picked out.

They consist of carbonate of lime, combined with a little phosphate of lime and gelatine. The quantity of the two last is too small, and their action on the living body too inconsiderable, to make any considerable difference in medical properties, between these concretions and soft carbonate of lime, as it occurs in the mineral kingdom.

Crab stones are said by most writers on the materia medica to be frequently counterfeited with tobacco-pipe clay, or compositions of chalk with mucilaginous substances. This piece of fraud, if really practised, may be very easily discovered: the counterfeits wanting the leafy texture which is observed upon breaking the genuine; more readily imbibing water; adhering to the tongue; and dissolving in vinegar, or the stronger acids, diluted with water, either entirely or not at all, or by piecemeal; whilst the true crab stones, digested in these liquors, become soft and transparent, their original form remaining the same, as the organization of the gelatine is not altered by the acid.

Officinal Preparation.

Cancrorum lapilli præparati. *E.*

Sp. CANCER PAGURUS. *Chelæ. Ed. Dub.*
The black-clawed crab. The claws.

THIS species of crab inhabits the sea, and is found especially in the North sea. Its claws are yellow, tipt with black; and they resemble the former article in every respect as medicines.

Officinal Preparations.

Cancrorum chelæ præparatæ. *L.*
Pulvis chelæ cancrorum compositus. *L.*
Trochisci cretæ. *L.*

CANELLA ALBA. *Lond. Ed. Dub.*

Canella Alba.

Willd. g. 942. *sp.* 1. *Dodecandria Monogynia.*—Nat. ord. *Oleraceæ.*

Off.—Cortex. The bark.

THE canella alba is a tall tree, which is very common in Jamaica, and other West-India islands.

The canella is the interior bark, freed from the epidermis, which is thin and rough, and dried in the shade. There are two sorts of canella in the shops, differing from each other in the length and thickness of the quills; they are both the bark of the same tree, the thicker being taken from the trunk, and the thinner from the branches.

It was introduced into Europe, according to Clusius, in 1605, and is brought to us rolled up in long quills, or flat pieces, thicker than cinnamon, and both outwardly and inwardly of a whitish colour, lightly inclining to yellow. It is a warm pungent aromatic, and in distillation with water it yields a large proportion of a very active volatile oil, of a yellow, or rather reddish colour, and of a sweet odour, approaching to that of cinnamon. It must not be confounded with the bark of the Wintera aromatica.

Medical use.—Canella alba is sometimes employed where a warm stimulant to the stomach is necessary. In America it is considered to be a powerful antiscorbutic. It is also added as a corrigent to other medicines.

Officinal Preparation.

Tinctura gentianæ composita. *E.*

CAPSICUM ANNUUM *Ed.*

Willd. g. 384. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Piper Indicum. Lond. Capsicum. Dub.

Cockspur pepper.

Off.—Fructus, capsulæ. The pod.

THIS is an annual plant, a native of South America, cultivated in large quantities in our West-India islands, and even frequently in our gardens, for the beauty of its pods.

The pods of this species are long, pointed, and pendulous, at first of a green colour, and, when ripe, of a bright orange red. They are filled with a dry loose pulp, and contain many small, flat, kidney-shaped seeds. The taste of capsicum is extremely pungent and acrimonious, setting the mouth, as it were, on fire.

The principle on which its pungency depends, I find, is soluble in water and in alcohol, is not volatile, reddens infusions of turnsole, and is precipitated by infusion of galls, nitrate of mercury, muriate of mercury, nitrate of silver, sulphate of copper, sulphate of zinc, red sulphate of iron (but the precipitate is neither blue nor green), ammonia, carbonate of potass, and alum, but not by sulphuric, nitric, or muriatic acid, or silicized potass.

Cayenne pepper is an indiscriminate mixture of the powder of the dried pods of many species of capsicum, but especially of the capsicum frutescens, or bird pepper, which is the hottest of all. Cayenne pepper, as it comes to us in powder from the West Indies, changes infusion of turnsole to a beautiful green, probably owing to the muriate of soda, which is always added to it, and to red oxide of lead, with which it is said to be mixed.

Med. use.—These peppers have been chiefly used as a condiment. They prevent flatulence from vegetable food, and have a warm and kindly effect in the stomach, possessing all the virtues of the oriental spices, without, according to Dr. Wright, producing those complaints in the head which the latter are apt to occasion. An abuse of them, however, is supposed to occasion visceral obstructions, especially of the liver. In the practice of medicine, they constitute one of the simplest and strongest stimulants which can be introduced into the stomach; their action not being followed by any narcotic effects. Dr. Wright says, that in dropsical and other complaints, where chalybeates are indicated, a minute portion of powdered capsicum forms an excellent addition; and he recommends its use in lethargic affections. It has also been successfully employed as a gargle in cynanche maligna, when it has resisted the use of cinchona, wine, and the other remedies commonly employed. Coma and delirium are common attendants of tropical fevers, and in such cases, cataplasms of capsicum have a speedy and happy effect. They redden the parts, but seldom blister, unless when kept on too long. In ophthalmia from relaxation, the diluted juice of capsicum is a sovereign remedy. Dr. Adair gave six or eight grains for a dose, made into pills; or he prepared a tincture, by digesting half an ounce of the pepper in a pound of alcohol, the dose of which was one or two drachms diluted with water.

CARBO LIGNI. *Ed. Dub.*

Charcoal of wood.

CHARCOAL, as it is commonly prepared, is not a pure oxide of carbon, but contains also a notable proportion of hydrogen, from which it may be purified by exposing it for some time to a strong heat. Munch directs, that for medical use it be reduced to fine powder, and heated in a covered crucible as long as any flame appears on removing the cover, and until it be fully red. It is then to be allowed to cool in the furnace, the upper layer of the powder to be removed, and the remainder to be sealed accurately up in ounce vials.

Medical use.—When the pneumatic pathology was in fashion, and phthisis and similar diseases were ascribed to hyper-oxygenation of the system, charcoal was strongly recommended as a powerful disoxygenizing remedy, and cases of its successful employment are even recorded.

In this place it will not be superfluous to notice the power ascribed to charcoal of putrifying various fetid or discoloured fluids. Lowitz found that it destroyed the adventitious colour and smell of vinegar, carbonate of ammonia, tartaric acid, alcohol, super-tartrate of potass, and other salts, and that it prevented water from becoming putrid at sea, especially when assisted by a little sulphuric acid. Meat which has acquired a maukish, or even putrid smell, is also said to be rendered perfectly sweet by rubbing it with powdered charcoal.

From its acknowledged effects in correcting the putridity of animal substances, it is probable that the virtues ascribed to it of preventing the putrid eructations which take place in some kinds of dyspepsia are better founded. Ten grains may be given for a dose. As an external application, powdered charcoal has been recommended in the cure of inflammation from external causes, gangrene, and all descriptions of fetid ulcers. The good effects of charcoal, or burnt bread, used as a tooth powder, in correcting the bad smell which the breath sometimes acquires from carious teeth are well known.

Pharm. Preparation.

-Murias barytæ. *E.*

CARBONAS.

Carbonate is a generic name for the combinations of the carbonic acid with earths, alkalies, and metallic oxides.

The nature of these substances was totally unknown, until the year 1756, when the discoveries of Dr. Black laid the foundation for the present state of chemical knowledge.

Before the brilliant epoch we have mentioned, the carbonates were supposed to be simple bodies; and the fact of their acquiring new and caustic properties by the action of fire, was explained, by supposing that the particles of the fire combined with them. Dr. Black, however, demonstrated, that these bodies in their caustic state are simple, and that their mildness is owing to their being combined with an acid, to which the name of carbonic is now given.

The most general character of the carbonates is, their effervescing when any of the stronger acids is poured upon them. This phenomenon is owing to these acids displacing, by their greater affinity, the carbonic acid, which flies off in the form of a gas.

The carbonates may be also deprived of their carbonic acid, either by the action of heat alone, or by heating them when mixed with charcoal, which decomposes the carbonic acid by combining with part of its oxygen, so that both the acid and the charcoal are converted into carbonic oxide gas.

The carbonates may be divided into three great families, the alkaline, the earthy, and the metallic.

Family 1. The alkaline carbonates have an urinous taste, tinge vegetable blues green, and are soluble in water, and insoluble in alcohol.

Family 2. The earthy carbonates are insipid, and insoluble in water, but soluble in water saturated with carbonic acid.

Family 3. The metallic carbonates scarcely differ in appearance from the metallic oxides.

We shall have immediately occasion to notice some individuals of each of these families.

CARBONAS BARYTÆ. *Ed.* *Barytes, Terra ponderosa.*

Carbonate of baryta, Barytes. Heavy spar.

Carbonated Baryta is rarely found in nature; and as it was first discovered by Dr. Withering, Mr. Werner give it the name of Witherite. Its colour is greyish-white, sometimes inclining to milk white, and sometimes with a slight tinge of yellow, from a mixture of iron, seldom greenish, often invested with a red ochry crust. It is found in solid masses, sometimes filling an entire vein, sometimes interspersed with sulphated baryta, frequently rounded, or affecting that form, seldom crystallized. Texture fibrous; fracture conchoidal; fragments, long splinters; specific gravity, 4.3 to 4.338. Although it has no sensible taste, it is poisonous. In medicine it is only used for preparing the muriate of baryta. It is found in Lancashire, Cumberland, Scotland, and Sweden, but is not common.

According to different analyses, its constituents are,

	Acid.		Baryta.		Water.
Withering,	20	+	80		
Pelletier,	22	+	62	+	16
Kirwan,	22	+	78		
Fourcroy,	10	+	90		

Officinal Preparation.

Carbonas barytæ. *E.*

CARBONAS CALCIS. *Ed.*

Creta. Lond. Dub.

Carbonated lime. Chalk.

This is the most common of all minerals, is found under a great variety of forms, and has various names, as chalk, limestone, marble, spar. In form it is either amorphous, stalactical, or crystallized. When amorphous, its texture is either foliated, striated, granular, or earthy. The primitive form of its crystals is a rhomboidal parallelopiped. Hardness, lustre, and transparency, various: when transparent, it causes double refraction; specific gravity from 2.315 to 2.78; colour, when pure, white; effervesces violently with muriatic acid, and dissolves in it entirely, or nearly so, forming a colourless solution.

Its different varieties may be arranged under,

1. *Creta alba.* Soft carbonate of lime. Chalk.
2. *Marmor album.* Indurated carbonate of lime. Marble.

They contain about 45 parts of carbonic acid, and 55 of lime.

In medicine it is given to correct acidity in the primæ viæ, especially when accompanied with looseness. Powdered chalk has been externally applied with success to scalds and burns.

Officinal Preparations.

Carbonas calcis præparatus. *E. L. D.*
Potio carbonatis calcis. *E. L.*
Trochisci carbonatis calcis. *E. L.*
Pulvis carbonatis calcis compositus. *E. L.*
——— cretæ compositus cum opio. *L.*
——— chelarum cancri compositus. *L.*
Solutio muriatis calcis. *E. D.*
Aqua supercarbonatis potassæ. *E.*
———————— ammoniæ. *E. L.*
Carbonas ammoniæ. *E. L.*

CARBONAS POTASSÆ IMPURUS. *Ed.*

Cineres clavellati. Lond. Kali impurum. Dub.

Alkali fixum vegetabile. Lixiva.

Pearl ashes. Potashes. Impure carbonate of potass. Fixed vegetable alkali.

The potashes of commerce are sent to us from the shores of the Baltic and from America. They are prepared by lixiviating the ashes of vegetables in barrels, first with cold, and then with hot water, filtering the ley, and evaporating it to dryness in an iron pot. In this state they still contain some vegetable matter, not perfectly incinerated, which gives them a brown or black colour. To destroy this, and render their colour purer, they are againt burnt in a reverberatory furnace. They now get the name of pearl ashes; but even yet they are very impure, and often contain the sulphates of potass and of lime, and the muriate of potass. They are also frequently adulterated with vegetable ashes, sand, and sulphate of potass. The ashes are detected by their difficult and imperfect solution; the sand, by the precipitation of silica in a gelatinous form by the addition of an acid, and the sulphate of potass by its crystallization. All vegetables which grow at a distance from the sea afford potashes by incineration: herbs give the largest proportion, then the leaves of trees, then shrubs, and woods the least. It formerly had the name of Fixed Vegetable Alkali; but it is also found, though much more sparingly, both in the animal and mineral kingdoms.

Vauquelin has given a table of the quantity of pure potass, and of heterogenous matters, contained in 1152 parts of the different potashes of commerce.

	Potass.	Sulphate of potass.	Muriate of potass.	Insoluble residuum.	Carb. acid and water.
Russian potashes,	772	60	5	56	254
American do.	857	145	20	2	119
Pearl ashes,	754	80	4	6	308
Potashes of Treves,	720	165	44	24	199
Dantzic ashes,	603	152	14	79	204
Potashes of Vosges,	444	148	510	34	304

The potass was estimated by the quantity of diluted nitrous acid saturated by it; the sulphate of potass by the precipitate formed with nitrate of baryta; and the muriate of potass by that formed with nitrate of silver.

All these different potashes, except the last, may be purified sufficiently for pharmaceutical purposes, by lixiviating them with a small proportion of cold water, and evaporating the ley to dryness in an iron pot.

Medical use.—Carbonate of potass is used in form of lotion, in rachitic and some cutaneous diseases, and as a stimulant to the inactive state of the vessels in certain ulcers. It is used internally as a diaphoretic or diuretic, and of late in calculous complaints; but its continued use seldom fails to injure the constitution, or the intestinal canal.

Officinal Preparations.

Carbonas potassæ. *E. L. D.*
Alcohol. *D.*
——— ammoniatum. *L. D.*
Spiritus ammoniæ fœtidus. *L.*

CARBONAS SODÆ IMPURUS. *Ed.*

Barilla. Lond. Barilla, Soda impura. Dub.

Impure Carbonate of soda. Barilla. Fixed mineral alkali.

Soda is a very common mineral production. It is the basis of sea salt; and combined with carbonic acid, it is found on the surface of the earth in Egypt, Syria, Barbary, Hungary, &c. and is obtained by the incineration of marine vegetables, especially the salsola soda and kali, the salicornia herbacea, &c. The Spaniards even cultivate these in salt marshes for the sake of the soda. After being cut down, they are dried like hay. A deep pit is then prepared, and a bundle or two of the dried vegetables set on fire are thrown into it. After being well kindled, other bundles are thrown in until the pit is filled. When the incineration is completed, the barilla is found in the bottom, caked into a solid mass, which is worked like a stony substance. Good barilla is firm, hard, heavy, dry, sonorous, spongy, and internally of a blue colour mixed with white spots, does not deliquesce, emits no unpleasant smell on solution, and does not leave a large proportion of insoluble matter. Incinerated soda is mixed with potash, muriate of soda, and other saline matters; mineral soda with clay and other earthy substances. The Egyptian soda was reckoned the best, then the Spanish (barilla), afterwards the Carthaginian, and that prepared from different species of fuci (kelp) is the worst.

But all these carbonated sodas are inferior in purity to those now manufactured in Britain, by decomposing the sulphate of soda.

That commonly used is obtained by the bleachers as a residuum in their method of preparing oxygenized muriatic acid, by decomposing muriate of soda with sulphuric acid and the black oxide of manganese.

The sulphate of soda is decomposed,

1. By carbonate of potass. Mr. Accum has described the manipulations of this mode. A boiling concentrated solution of about 560 pounds of Amerian potashes is ladled into a boiling solution of 500 pounds of sulphate of soda, agitated together, and the whole quickly heated to ebullition. It is then drawn off into leaden cisterns, lined with thick sheet-lead, and allowed to cool in a temperature which should not exceed 55°.

   The fluid is then drawn off, and the mass of salt washed with cold water, to free it from impurities, and again put into the boiler with clean water. This second solution is also evaporated at a low heat, as long as any pellicles of sulphate of potass form on its surface, and fall to the bottom of the fluid. The fire is then withdrawn, and the fluid ladled out into the cistern to crystallize. Unless the fluid be allowed to cool pretty low before it is removed to crystallize, the salt obtained will contain sulphate of potass.

2 By acetate of lime. The acetous acid for this purpose is obtained by distillation from wood, during its conversion into charcoal.

3. By litharge or sub-carbonate of lead. Very pure carbonate of soda is prepared by this process in the vicinity of Edinburgh.
4. By decomposing the sulphuric acid by charcoal. About 500 cwt. of sulphate of soda, and 100 cwt. of charcoal, are ground together, and the mixture exposed in a reverberatory furnace until it becomes pasty. It is then transferred into large casks, and lixiviated. The ley is afterwards evaporated and crystallized. By this, or a similar process, very pure carbonate of soda is manufactured in the west of Scotland.

On the continent, muriate of soda is sometimes decomposed by potass, and sometimes by lime.

Carbonate of soda is an article of the greatest importance in many manufactures.

Medical use.—Carbonate of soda is now much used in medicine. Its primary effect is to correct acidity in the *primæ viæ.* It also acts as a tonic, and in many instances gives great relief in calculous complaints, although there can be little reliance placed upon it as a lithontriptic. Being an efflorescent salt, it is conveniently given in the form of powder, or made up into pills.

Officinal Preparations.

Carbonas sodæ. *E. L. D.*
Soda siccata. *D.*

CARDAMINE PRATENSIS. *Ed.*

Willd. g. 1257. *sp.* 19. *Smith. Flor. Brit. g.* 304. *sp.* 4. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ.*

Cardamine. Lond. Dub.

Meadow ladies smock. Cuckow flower.

Off.—Petalum, folium. The petals and leaves.

Ladies smock is a perennial plant, which grows in meadow-grounds, sends forth purplish flowers in the spring; and in its sensible qualities resembles the *sisymbrium nasturtium.*

Medical use.—Long ago it was employed as a diuretic; and it has been again introduced in nervous diseases, as epilepsy, hysteria, chorea, asthma, &c. A drachm or two of the powder is given twice or thrice a-day. It has little sensible operation, except that it sometimes acts as a diaphoretic.

CARUM CARUI. *Ed.*

Willd. g. 561. *sp.* 1. *Smith. Flor. Brit. g.* 152. *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Caruon. Lond. Dub.

Common caraway.

Off.—Semen. The seeds.

Caraway is a biennial umbelliferous plant, cultivated in our gardens, both for culinary and medicinal use. The seeds have an aromatic smell, and warm pungent taste.

Med. use.—They are employed as stomachic and carminative in flatulent colics.

Officinal Preparations.

Oleum volatile cari carui. *L. D.*
Spiritus cari carui. *E. L. D.*
Decoctum anthemidis nobilis. *E.*
Tinctura cardamomi composita. *L. D.*
———— sennæ. *L. D.*
Confectio opiata. *L.*
Emplastrum cumini. *L.*

CARYOPHILLUS AROMATICUS. See EUGENIA.

CASSIA.

Willd. g. 813. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ.*
Sp. 18. Cassia Fistula. *Ed.*
Cassia fistularis. Lond. Dub.
Cassia tree.

Off.—Fructus, pulpa. The fruit and pulp.

This tree is indigenous in India and Egypt, and is cultivated in Jamaica. It rises to about thirty feet high, and has long flower spikes, with yellow papilionaceous blossoms.

Its fruit is a cylindrical pod, scarcely an inch in diameter, a foot or more in length: the outside is a hard, brown bark; the inside is divided by thin transverse woody plates, covered with a soft black pulp, of a sweetish taste, with some degree of acrimony. There are two sorts of this drug in the shops; one brought from the East Indies, the other from the West (Cassia Javanica?) The canes or pods of the latter are generally large, rough, thick-rinded, and the pulp nauseous; those of the former are less, smoother, the pulp blacker, and of a sweeter taste: this sort is preferred to the other. Such pods should be chosen as are heavy, new, and do not make a rattling noise, from the seeds being loose within them, when shaken. The pulp should be of a bright, shining, black colour, and have a sweet taste, neither harsh, which happens from the fruit being gathered before it has grown fully ripe, nor sourish, which it is apt to become upon keeping, nor at all mouldy, which is frequently the case, from its being kept in damp cellars, or moistened, in order to increase its weight. Greatest part of the pulp dissolves both in water and in alcohol; and may be extracted from the pod by either. The shops boil the bruised pod in water, and afterwards evaporate the solution to a due consistence.

Med. use.—The pulp of cassia, from its saccharine and extractive constituents, is a gentle laxative medicine, and is frequently given, in a dose of some drachms, in costive habits. Some direct a dose, of two ounces, or more, as a cathartic, in inflammatory cases, where the more acrid purgatives are improper; but in these large quantities it generally excites nausea, produces flatulence, and sometimes gripings of the bowels, especially if the cassia be not of a very good kind: these effects may be prevented by the addition of aromatics, and by exhibiting it in a liquid form.

Officinal Preparations.

Pulpa cassiæ fistularis expressa. *E. L.*
Electuarium cassiæ fistularis. *E. L. D.*
———— sennæ. *E. L.*

Sp. 24. Cassia Senna. *Ed.*
Senna. Lond. Dub.
Senna.

Off.—Folium. The leaves.

This species of cassia is annual, although in its mode of growth it resembles a shrub, and sends out hollow woody stems, to the height of four feet. It grows principally in Upper Egypt, from whence the leaves are brought, dried, and picked from the stalks, to Alexandria in Egypt, and thence imported into Europe. They are of an oblong figure, sharp-pointed at the ends, about a quarter of an inch broad, and not a full inch in length, of a lively yellowish green colour, a faint, not very disagreeable smell, and a sub-acrid, bitterish, nauseous taste. Some inferior sorts are brought from other places: these may be easily distinguished by their being either narrower, longer, and sharper-pointed, from Mocha; or larger, broader, and round-pointed, with small prominent veins, from Italy; or large and obtuse, of a fresh green colour, without any yellow cast, from Tripoli.

It has been customary to reject the pedicles of the leaves of senna, as causing gripes and pains in the bowels; but this is a mere prejudice, for both leaves and pedicles act in the very same way. Neumann, from 480 parts of senna, got 143 alcoholic extract, and afterwards 140 watery; and inversely, 245 watery, and only 28 alcoholic, so that it seems to consist chiefly of mucilage and extractive.

Medical use.—Senna is a very useful cathartic, operating mildly, and yet effectually; and, if judicially dosed and managed, rarely occasioning the ill consequences which too frequently follow the exhibition of the stronger purges. The only inconveniencies complained of in this drug are, its being apt to gripe, and its nauseous flavour.

These are best obviated by adding to the senna some aromatic substance, as ginger, cinnamon, &c. and by facilitating its operation by drinking plentifully of any mild diluent.

Senna may be given in substance to the extent of about a drachm, but it is rather too bulky, and it is therefore better to divide it into two doses, and to take one half at night, and the other in the morning. It is more conveniently given in the form of infusion, which is generally made by pouring about six ounces of boiling water upon from two to six drachms of senna leaves in a tea-pot, and letting it stand about an hour. Senna ought never to be ordered in decoction, Gren says, because it becomes perfectly inert, from the total dissipation of the nauseous and volatile principle on which its purgative effects depend. The tincture, on account of the menstruum, cannot be given in doses large enough to purge.

Officinal Preparations.

Electuarium cassiæ sennæ. *E. L. D.*
Extractum cassiæ sennæ. *E. L.*
Infusum sennæ. *L. D.*
———— tartarisatum. *L.*
——— tamarindi cum senna. *E. D.*
Pulvis sennæ compositus. *L.*
Tinctura sennæ composita. *E. L. D.*
Syrupus mannæ. *D.*

CASTOR FIBER. *Ed.*

Mammalia Rodentia, Cuvier.

Off.—Materia in folliculis prope anum collecta, *Castoreum* dicta. *Ed.* Materia in folliculo prope anum sito collecta. *Lond.*
Castoreum Rossicum. *Dub.*
——— Canadense. *Dub.*

The beaver. Castor. The substance collected in the follicles near the anus.

The beaver is an amphibious quadruped, strongly characterized by its flat, horizontal, scaly tail. It is found in the northern parts of Europe, Asia, and America, on the banks of lakes and rivers. In inhabited countries it is a solitary slothful animal, but in desert regions it lives in society; the remarkable manners of which, and the immense works effected by the united labours of the individuals of their republic, have rendered the natural history of this animal familiar to every one. In both sexes, between the anus and pudendum, there are four follicles, of an oblong shape, smaller above, and larger below, formed of a tough membrane, almost resembling leather. The two largest and undermost of these, which are also connected, and lie parallel and close to each other, contain an oily fluid secretion, which is the substance known by the name of Castor. It is preserved by cutting out the entire bags, and drying them in the smoke.

The best castor comes from Russia, Prussia, and Poland. The cods should be dry, gibbous, roundish, heavy, solid, and filled with a solid substance contained in membranous cells, somewhat tough, but brittle, of a dark-brown colour, of a peculiar disagreeable, narcotic smell, and a nauseous, bitter, acrid taste. The Canadian castor is of an inferior quality; the cods are smaller, thin, oblong, and much corrugated, and the castor itself has much less smell and taste: what is very old, quite black, and almost destitute of smell and taste, is unfit for use, as well as the counterfeited castor, which is a mixture of various gummy resins and other substances, with a little real castor, artificially interspersed with membranes, and stufied into the scrotum of a goat. This imposition is easily detected, by the weaker degree of its smell and taste, by chemical analysis, and even by mere external examination; for to the real bags, the two smaller and upper follicles, filled with a fatty matter, are always attached.

Neumann got from 480 parts of castor, 140 alcoholic extract, and afterwards 80 watery; and inversely, 140 watery, and 20 alcoholic. The first alcoholic extract retained the whole flavour of the castor, as none of it rose in distillation with the alcohol. The distilled water, on the contrary, contained the whole flavour, and the watery extract was merely bitter. Cartheuser obtained from it a volatile oil by distillation.

Medical use. Castor is an excellent antispasmodic. It is very little heating, and acts particularly on the uterine system.

It is given with advantage,

1 In typhoid fevers.
2. In spasmodic diseases, especially in hysteria and epilepsy, and in cases of difficult parturition, from a spasmodic contraction of the mouth of the uterus after the membranes have burst.
3. In amenorrhœa.

It is exhibited most advantageously in the form of powder, in doses of from 10 to 20 grains, and in clysters, to a drachm. Diluted alcohol extracts its virtues; therefore it may be also given in the form of tincture. But its exhibition in the form of extract or decoction is improper.

Officinal Preparation.

Tinctura Castorei Rossici. *E. L. D.*

CENTAUREA BENEDICTA. *Ed.*

Willd. g. 1548. *sp.* 89. *Syngenesia Polygamia frustranea.*—Nat. ord. *Compositæ capitatæ.*

Carduus Benedictus. Lond. Dub.

Blessed Thistle.

Off.—Herba, folium. The leaves or plant.

This is an annual plant, indigenous in the Grecian islands, and cultivated in our gardens. It flowers in June and July, and perfects its seeds in the autumn. The herb should be gathered when in flower, quickly dried, and kept in a very dry airy place to counteract its tendency to rot, or grow mouldy. The leaves have a penetrating bitter taste, not very strong or very durable, accompanied with an ungrateful flavour, from which they are in a great measure freed by keeping. Water extracts, in a little time, even without heat, the lighter and more grateful parts of this plant; if the digestion be continued for some hours, the disagreeable parts are taken up. A strong decoction is very nauseous and offensive to the stomach. Rectified spirits acquire a very pleasant bitter taste, which remains uninjured in the extract.

Neumann got from 1920 parts 270 alcoholic, and afterwards 390 watery extract; and inversely, 600 watery, and 60 alcoholic.

Med. use.—The virtues of this plant seem to be little known in the present practice. The nauseous decoction is sometimes used to provoke vomiting, and a strong infusion to promote the operation of other emetics. But this elegant bitter, when freed from the offensive parts of the herb, may be advantageously applied to other purposes. Excellent effects have been frequently experienced from a slight infusion of carduus, in loss of appetite where the stomach was injured by irregularities. A stronger infusion, made in cold or warm water, if drunk freely, and the patient kept warm, occasions a plentiful sweat, and promotes the secretions in general.

The extract prepared by evaporating the expressed juice, with the addition of a little alcohol, to prevent it from becoming mouldy, has been strongly recommended in the catarrh of children.

The seeds of this plant are also considerably bitter, and have been sometimes used with the same intention as the leaves.

CEPHAELIS IPECACUANHA.

Willd. g. 356, *species nova. Pentandria Monogynia.*—Nat. ord. *Aggregate.*

Ipecacuanha. Lond. Ed. Callicocca Ipecacuanha. Dub. Ipecacaun.

Off.—Radix. The root.

Ipecacuan, in the language of South America, means vomitting root, and is applied to various vegetables which possess that property in any remarkable degree; hence the confusion and contradictions which have long prevailed concerning the plant which furnishes our officinal Ipecacuan: but this confusion is increased by several varieties of Ipecacuan being found in the shops.

1st, The ash-coloured or Peruvian ipecacuan is a small wrinkled root, bent and contorted into a great variety of figures, brought over in short pieces, full of wrinkles and deep circular fissures, quite down to a small white woody fibre that runs in the middle of each piece: the cortical part is compact, brittle, looks smooth and resinous upon breaking: it has very little smell; the taste is bitterish and subacrid, covering the tongue as it were with a kind of mucilage. This, according to Mutis, is obtained from the Psycotria emetica, and is that commonly used.

2d, The brown ipecacuan is small, and somewhat more wrinkled than the foregoing; its bark is of a brown or blackish colour without, and white within; this is brought from Brazil, and is the root of a cephaëlis, which is perennial, and grows in moist shadowy situations. A complete monography of it, and an excellent plate, were published, in the sixth volume of the Transactions of the Linnæan Society, by Professor Brotero, who calls it the Callicocca Ipecacuanha; but the genus Callicocca has been united by Willdenow with that of Cephaëlis, to which we have therefore referred it. The plate of Brotero corresponds with that published in Woodville's Medical Botany, vol. iii. from a plant sent in spirits from Brazil by Governor Philips to Sir Joseph Banks, but which unfortunately was not in flower, and also with the rude draught of Piso, who first examined it. It has been sometimes observed, even in a small dose, to produce violent effects.

3d, The white sort is woody, has no wrinkles, and no perceptible bitterness in taste. It is probably the root of a viola. Though taken in a large dose, it has scarcely any effect at all.

Besides these, the name of Ipecacuan is given to various species of Cynanchum, Asclepias, Euphorbia, Dorstenia, and Ruellia. With regard to their comparative strengths, Decandolle says, that vomiting is produced by 22 grains of the Cynanchum Ipecacuanha, 24 of the Psycotria emetica, 60 to 72 of the Viola calceolaria, and one to three drachms of the Viola Ipecacuanha.

Ipecacuan was first brought into Europe about the middle of last century, and an account of it published about the same time by Piso; but it did not come into general use till about the year 1686, when Helvetius, under the patronage of Lewis XIV. introduced it into practice.

Neumann got from 7680 parts, 1440 alcoholic, and afterwards 1880 watery extract; and inversely, 2400 watery, and 600 alcoholic. I find that the tincture of ipecacuan does not redden infusion of lithmus, or precipitate solution of gelatine; that it is precipitated by water, by red sulphate of iron, and readily acquires a green colour from excess of the chalybeate, and by infusion of nut galls. According to Dr. Irvine, the watery solution is more emetic than the alcoholic, the decoction than the distilled water, and the cortical than the ligneous part. Others have found, that the resinous part is more apt to act upon the intestinal canal, and to operate by stool. By long-continued boiling, it becomes almost inert; and the emetic property of ipecacuan is most effectually counteracted by means of the acetic acid, insomuch that thirty grains of the powder, taken in two ounces of vinegar, produced only some loose stools.

From these experiments it evidently appears, that ipecacuan contains cinchonin and a resin, and that its emetic property does not depend upon the latter, although we can scarcely attribute it to the former, as in other substances it does not manifest any emetic property. It is, therefore, probably owing to some other principle, soluble in water and alcohol.

Med. use.—The primary effect of ipecacuan is that of stimulating the stomach. If the dose be sufficiently large, it excites vomiting, by inverting the perisaltic motion of the stomach and duodenum; in a smaller dose it only produces nausea, and operates by stool, and in a still smaller dose it gently stimulates the stomach, increases the appetite, and facilitates digestion. Its secondary effects depend on the sympathy of other parts with the stomach; and in this way only can we explain its action as an antispasmodic, diaphoretic, expectorant, and in checking hæmorrhagies. Its beneficial effects, in some cases, also seem to be owing to the general concussion given to the whole system during the action of vomiting.

Ipecacuan, properly administered, often proves serviceable,

1. In intermittent fevers. It has frequently succeeded in stopping these, when given about an hour before an accession was expected, and also when given so as to produce vomiting at the time of an accession, or at the end of the cold stage.
2. In continued fevers. We have never seen more decidedly beneficial effects from the use of any medicine whatever, than from the exhibition of ipecacuan in the commencement of typhus fever. An emetic, succeeded by a diaphoretic regimen, when administered sufficiently early in the disease very frequently cuts it

short at once; and when it fails in this desirable object, it always has a beneficial influence on the progress of the fever.

3. In inflammatory diseases, rheumatism, bubo, swelled testicle.
4. In exanthematous diseases, when the eruption is disposed to recede.
5. In hæmorrhagies, when given in nauseating doses.
6. In profluvia, especially in dysentery, so much so, that it was formerly esteemed a specific against that disease. But Cullen attributes its good effects, in this instance, to its producing a steady determination of the perisaltic motion of the intestine downwards, when given in repeated small doses.
7. In many spasmodic diseases; in epilepsy, asthma, dyspnœa, pertussis, chronic diarrhœa, hysteria, melancholy, mania.
8. In cachetic diseases, as in some kinds of dropsy.
9. In impetiginous diseases; in jaundice.
10. In local diseases; in amaurosis, and several of the dysorexiæ.
11. Lastly, In every instance when we wish to evacuate the stomach, as when it is overloaded with food, or when poison, especially opium, has been swallowed.

The use of ipecacuan, as an emetic, is contraindicated,

1. Where there is a disposition to hæmorrhagy.
2. Where there is an increased flow of blood towards the head.
3. In very irritable subjects.
4. In pregnant women, and persons afflicted with hernia.

Ipecacuan is exhibited,

1. In substance, in powder. Full vomiting will generally be produced in an adult by a scruple or half a drachm; and though less might answer the purpose, fortunately an over-dose is scarcely attended with any inconvenience, as the whole of it is vomited with the contents of the stomach as soon as it operates. The vomiting is promoted and facilitated by drinking copiously of warm watery fluids. On the contrary, when vomiting is not intended, liquids must be rather drunk sparingly, and the dose must be diminished to a grain or less. In such small doses it is conveniently combined with any proper adjunct, in the form of powder, pill, or bolus.

2. In infusion. One drachm may be infused in four ounces of water, and taken in repeated doses till it operate.
3. Infused in wine.

Ipecacuan not only checks the narcotic effects of opium, and is therefore one of the best antidotes for its poison, but reciprocally the emetic powers of ipecacuan are checked by the addition of opium, and the combination operates by increasing the cuticular discharge.

Officinal Preparations.

Vinum Ipecacuanhæ. *E. L. D.*
Pulvis Ipecacuanhæ et opii. *L. D.*

CERA.

CERA FLAVA. *E. L. D.*
Yellow wax.

FOR this useful substance we are indebted to the common honey bee (*apis mellifica*), an insect belonging to the class of *Hymenoptera mellita* of Cuvier. It is, however, a vegetable production, and is collected by the bees from the surface of leaves, and the antheræ of flowers. They employ it to form the combs in which the honey and larvæ are deposited.

It is found in the shops in round cakes, which are formed by melting the combs in hot water, after all the honey has been expressed from them. The wax swims above, and the impurities either sink to the bottom, or are dissolved in the water. When recent, it is tenacious, but brittle, of a yellow colour, and sweet honey-like smell; dry, not greasy, to the feel; insoluble in water, and in cold alcohol, or ether; soluble in boiling alcohol and ether, in the fat oils and alkalies; fusible and inflammable. In selecting it, we should observe that the cakes be brittle, have a pleasant yellow colour, an agreeable smell, no taste, do not adhere to the teeth when chewed, and burn entirely away. When adulterated with resin, the fraud is detected by its taste, and the action of alcohol, which dissolves the resin. When mixed with pease meal or earthy substances, it is more brittle, of a paler colour, and may be separated from them by liquefaction and straining. When combined with tallow, it becomes less brittle, and softer, and has an unpleasant smell.

CERA ALBA. *Lond. Ed. Dub.*
White wax.

THE yellow colour of bees wax, and its peculiar smell, may be destroyed by the combined action of water, air, and the sun's rays. In the process for bleaching wax, we, therefore, extend its surface as much as possible, by melting it, and forming it into thin plates, which are fully exposed to the sun's rays, upon linen stretched in frames, and repeatedly moistened, until they acquire the whiteness desired. It is then usually melted into thin discs. White wax is more brittle, less fusible, and heavier than yellow wax. It is sometimes mixed with white oxide of lead, or with tallow. For medical use, it has no advantage over yellow wax

Medical use.—When taken internally, wax agrees in its effects with the fat oils, and though less frequently prescribed in this way, it is preferable, being less apt to become rancid. Poerner recommends it as an excellent remedy in diseases of the intestines, attended with pain, excoriation, and obstinate diarrhœa. He gave a scruple, or half a drachm of wax, three or four times a-day, in the form of an emulsion, by melting it first with some fixed oil, and then mixing it with a decoction of groats by trituration with the yolk of an egg. But by far its principal use is for the formation of cerates, ointments, plasters, &c.

Officinal Preparations of yellow wax.

Cera flava purificata. *D.*
Ceratum resinæ flavæ. *L.*
———— saponis. *L.*
———— lithargyri acetati compositum. *L.*
———— lapidis calaminaris. *L.*
Emplastrum aromaticum. *D.*
———— assæfœtidæ. *E.*
———— ceræ. *E. L.*
———— galbani. *D.*
———— gummosum. *E.*
———— cumini. *L.*
———— meloes vesicatorii. *E.*
———————— compositum. *E.*
———— oxidi ferri nitri. *E.*
Oxidum antimonii vitrificatum cum cera. *E.*
Unguentum ceræ flavæ. *D.*
———— elemi. *D.*
———— infusi melóes vesicatorii. *E.*
———— resinæ flavæ. *E. L. D.*
———— picis. *E.*
———————— Burgundici. *L.*
———— sabinæ. *D.*

Officinal Preparations of white wax.

Ceratum simplex. *E.*
———— spermatis ceti. *L.*
Linimentum simplex. *E.*
Unguentum ceræ albæ. *L. D.*
———— cerussæ acetatæ. *L.*
———— simplex. *E.*
———— spermatis ceti. *L. D.*

CERVUS ELAPHUS.

Mammalia ruminantia.
Cervus. Lond.

The stag, or hart.

Off.—Cornu. E. Cornu cervinum. *L. D.* The horns.

THE male has two round solid horns on his forehead, with several conical branches, the number of which ascertains the age of the animal to which they belong. These horns fall off, and are renewed every year. When first produced, they are soft, full of blood-vessels, and covered with a velvety skin; but they soon lose their covering, and become hard, compact, and bony.

In their nature, they do not seem to differ from bone, except in containing a larger proportion of cartilage. They afford a very considerable quantity of gelatine, by decoction with water, and hartshorn shavings are still employed in domestic economy, for furnishing a nutritious and demulcent jelly. By the action of fire, their products are the same with those of animal substances in general; and they were formerly so much used for the preparation of ammonia, that it was commonly called Salt or Spirit of Hartshorn. By burning, they are totally converted into phosphate of lime.

Officinal Preparations.

Cornu cervi ustum. *L. D.*
Liquor volatile cornu cervi. *L. D.*
Sal cornu cervi. *L. D.*
Oleum cornu cervi. *L. D.*
Oxidum antimonii cum phosphate calcis. *E. L. D.*

CHIRONIA CENTAURIUM. *Ed.*

Willd. g. 394. *sp.* 9. *Smith Flor. Brit. g.* 102. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Rotaceæ.*

Centaurium minus. Dub. Lond. Gentiana centaureum.
Smaller Centaury.

Off.—Summitas florens, Cacumen. The flowery heads.

THIS plant is annual, and grows wild in many parts of England on barren pastures. It flowers between June and August. The corolla is said to have no taste; and therefore the herb, which is intensely bitter, should be preferred to the flowering tops, which derive their virtues only from the stalks connected with them. It agrees in every respect with other pure bitters.

Neumann got from 480 parts 210 alcoholic, and 140 watery extract, and inversely 320 watery, and 40 alcoholic.

CINCHONA.

Willd. g. 346. *Pentandria Monogynia.*—Nat. ord. *Contortæ.*

Sp. 1. CINCHONA OFFICINALIS. *Ed.*

Cinchona cordifolia, Mutis. *Cinchona. Lond. Cinchona,* vulgo *Cortex Peruvianus. Dub.*
Officinal Cinchona.

Off.—Cortex. The bark commonly called Peruvian bark, of which the Edinburgh college enumerates three varieties:

a. The common, the yellow of some foreign authors.
b. The yellow, the orange of some foreign authors.
c. The red.

By the recent observations of the Spanish botanists, it is now, however, ascertained, that these are not only the barks of distinct species of cinchona, but that probably each of them is indiscriminately taken from several different species. Ruiz and Pavon have described fifteen species, natives of Peru and Chili; and if to them we add those of Tafalla and Vahl, twenty-five distinct species have been described, of which seven have been found in North America, in the neighbourhood of Santa Fé, by Mutis. Cinchona, considered as a genus, is a mountainous tree, and is never found in the plains. It grows to a great height, and formerly its trunk was often thicker than a man's body. But since its bark has come into such general use, few trees are to be seen thicker than the arm. Indeed, there is reason to fear, that it will become still more scarce, as no attention is paid to its cultivation, and the trees always die after being stripped of their bark. This operation is performed in the dry season from September to November. The bark is then carefully dried in the sun, and packed in skins, which contain from 100 to 150 pounds, and are called by the Spaniards zeronne. In these, coarse and fine pieces of the same kind of bark are promiscuously mixed, but they are afterwards sorted.

1. Common pale bark. This is said to be the bark of the *Cinchona cordifolia* of Mutis, under which he includes the *hirsuta*, *ovata*, *purpurea*, and *micrantha* of the Flora Peruviana, the *officinalis* of Linnæus, and the *pubescens* of Vahl.

In commerce, we have several varieties of the common pale bark, the most remarkable of which are, the quilled bark, which comes from Loxa, and the flat bark, from Guanaco.

The bark which comes from Loxa consists of thin, singly or doubly rolled pieces, four or five inches long, and scarcely a line in thickness; externally rough, of a greyish brown colour, and generally covered with a kind of lichen; internally of a cinnamon colour. Its fracture should not be fibrous or powdery, but even and shining. It has a peculiar aromatic smell, and a pleasant, bitter, astringent taste.

The bark which comes from Guanaco consists of much thicker, coarser, and flatter pieces; externally of a dark brown, or almost black colour, but internally it has the same cinnamon colour; and in its resinous fracture, smell, and taste, it exactly resembles the former. When genuine, both varieties are excellent remedies, although the former be generally preferred on the continent, and the latter in Britain.

2. Yellow Peruvian bark. This variety of bark has only been introduced into European practice since 1790, when it was sent from Santa Fé by Mutis. It is the bark of his *Cinchona lancifolia*, under which he includes *the nitida*, *glabra*, or *lanceolata*, *fusca* or *rosea*, *angustifolia*, or *tunita*, the *officinalis* of Condamine and Vahl. It consists of pieces about six inches in length, thicker, and less rolled up than the common bark. Its internal surface is of a deeper red. It sometimes wants the epidermis, which is often as thick as the bark itself. It is lighter and more friable than the former variety; its fracture is fibrous; and when reduced to powder, its colour is paler. Its taste is much more bitter, astringent, and stronger; but its smell is weaker. Its decoction, when hot, is redder; but when cold, paler. Its solution strikes a deeper colour with sulphate of iron. It contains more of the active constituents than either of the others, but less gum than the common, and less resin than the red. It is much more powerful than the preceding species, and, according to Mutis, is the only one which is directly febrifuge. The epidermis should always be removed before it be powdered.

3. Red Peruvian bark is obtained from the *Cinchona magnifolia* of Ruiz and Pavon, the *oblongifolia* of Mutis. It occurs generally in much larger, thicker, flatter pieces but sometimes also in the form of quills. It is heavy, firm, sound, and dry; friable between the teeth; does not separate into fibres; and breaks, not shivery, but short, close, and smooth. It has three layers: the outer is thin, rugged, of a reddish brown colour, but frequently covered with mossy matter; the middle is thicker, more compact, darker coloured, very resinous, brittle, and yields first to the pestle: the inmost is more woody, fibrous, and of a brighter red. Its powder is reddish, like that of Armenian bole.

Its astringency and bitterness are more intense, and it contains more resin than the pale bark. It is not, however, allowed by Mutis to be, like the yellow bark, directly febrifuge. It is said to be more frequently adulterated.

The great price of Cinchona bark has sometimes tempted dishonest men to adulterate it with other similar and less powerful barks, and, what is still more blameable, with genuine bark, from which the active constituents have been entirely extracted, by decoction with water.

In selecting Cinchona bark, we must therefore take care, that, besides the characteristics already noticed, it be dense, heavy, and dry, not musty, or spoiled by moisture, and that a decoction made of it have a reddish colour when warm, but when cold become paler, and deposite a brownish red sediment. Those pieces whose taste is simply intensely bitter or very astringent, or nauseous, or merely mucilaginous, whose surface is smooth, or polished, of a dark colour, or pale yellow, or red, which are tough or spongy, whose bark is fibrous, woody, or powdery, and their internal colour white or grey, are to be rejected.

There are few vegetable substances which have been subjected to analysis more frequently, and by abler chemists, than the Cinchona bark. But from the difficulty of the subject, and from essential differences in the chemical properties of several varieties confounded under one denomination, contradictory results have arisen, and our knowledge of the subject is still imperfect. Vauquelin has lately done much to lessen this confusion, by shewing that there are three, if not four classes of Cinchona bark, differing essentially in chemical constitution; but unfortunately he has not been able to designate, with botanical accuracy, the individuals he found to belong to each.

The first class precipitate astringents, but not gelatine.

The second precipitate gelatine, but not astringents.

The third precipitate both astringents and gelatine. And,

Lastly, Some barks confounded with these precipitate neither astringent nor gelatine; but these Vauquelin, viewing the genus chemically, does not consider as Cinchonas.

Individuals in each of the three first classes are capable of curing intermittents, which shews how insufficient our analysis, in its present state, is for explaining the connection between the medical virtues and chemical properties of this remarkable genus. Besides these principal differences, on which Vauquelin founds his classification, Cinchona barks vary in the effects of many chemical agents. The infusions of some kinds redden turnsole, others do not affect it; some impart a deep colour to water, others very little; some affect certain metallic solutions, which others do not; and the decoctions of some kinds remain transparent after becoming cold, others grow turbid as they cool, and deposite a copious precipitate. The following mode of analysis, however, will give an idea of the composition of the second class:—The cold infusion has a red colour, more or less brown or yellow; bitter taste, with more or less astringency; becoming, in a few days, covered with a green mould. On evaporating the infusion, if it be permitted to cool repeatedly during the process, it becomes turbid, and deposites a precipitate for several times. If these precipitates be separated, and the supernatant fluid, after it ceases to become turbid on cooling, be evaporated to the consistence of a soft extract, and treated with alcohol, there remains only a viscid substance, of a brown colour, almost without bitter taste, insoluble in alcohol, perfectly soluble in water, not rendering it turbid on cooling, and which, by spontaneous evaporation, is analyzed into a saline mass, consisting of reddish brown crystals, hexahedral, rhomboidal, or square, and a mucilaginous matter which remains dissolved in the mother-water.

The precipitate which is deposited on the cooling of the concentrated infusion, when dried, has a red brown colour and an intensely bitter taste. It is readily soluble in alcohol, especially when heated. The tincture is decomposed by water, and yields crystals on spontaneous evaporation. It is sparingly and only partially soluble in cold water, more copiously and completely in boiling water, which, however, again becomes turbid on cooling. Its solution reddens tincture of turnsole, grows mouldy in a few days, does not precipitate tartar emetic, or solution of gelatine; is not visibly acted upon by acids, but with alkalies is coagulated into a thick whitish matter, becoming brown and somewhat hard by exposure to the air, softening with heat, and acquiring the ductility and silky gloss of turpentine.

The saline mass which crystallizes from the mother-water, on being purified by repeated solutions and crystallizations, is obtained in the form of white square or rhomboidal plates, often grouped, with almost no taste, soluble in about five waters at 50°, insoluble in alcohol, destructible by fire, not decomposed by ammonia, acetate of lead, or nitrate of silver, but by the fixed alkalies, and the oxalic and sulphuric acids, and by infusion of tan, and of some varieties of cinchona. This salt M. Vauquelin discovered to consist of lime, and a new acid which crystallizes in plates, has a very acid taste, forms soluble and crystallizable combinations with the alkalies and earths, and does not precipitate the nitrates of silver, mercury, or lead. M. Vauquelin has given it the name of Kinic acid; but as this would lead us to suppose that it was obtained from Kino, it appears to me that it ought to be named the Cinchonic acid, from the systematic name of the tree from whose bark it has been first obtained.

Mr. Vauquelin has also analyzed the barks of the cinchona pubescens and officinalis, which he refers to the first class. In almost every respect the analysis agrees with that now detailed, except in the chemical properties of the deposit from the concentrated infusion, which in the present instance produces a copious precipitate in the infusion of nut-galls, as well as in tartar emetic and nitrate of mercury. These deposits, he observes, differ from resins in being soluble in water, in acids and in alkalies, in acting as a dye, in decomposing metallic solutions, and in their watery solution becoming mouldy. He is inclined to consider them as a peculiar vegetable principle, not yet sufficiently examined.

Having thus detailed the latest experiments on this important subject, it may not be superfluous to notice the observations of preceding chemits, with a view of rendering the history of the analysis of cinchona more perfect. Neumann got from 7680 parts of common cinchona 640 alcoholic, and afterwards 300 watery extract; and inversely 330 watery and 600 alcoholic; from which it might be inferred, that there were about 600 parts soluble in alcohol only, 300 in water only, and 30 or 40 in both; but the proportion of the last is certainly too small. Fourcroy extracted from 576 parts of red bark, 38 by water, and afterwards 24 by alcohol. Marabelli got from a pound of yellow bark 464 grains of gum, 470 of extractive mucous matter, 292 of extractive resinous matter, and 125 of resin, besides saline matters, &c. Lewis observed, that the decoction became turbid on cooling, and that the precipitate was soluble in alcohol. He also pointed out the deep green colour which decoctions of cinchona acquire from the addition of chalybeates. Dr. Irving afterwards found, that recent decoctions gave a black colour, while those which had been kept some time gave a green. I may add, that the tincture gives a black, while the cold infusion gives a green; and that, in all cases where an excess of the chalybeate is used, a green colour is produced. These effects have been ascribed to the presence of tannin; but they have little resemblance to the intensity and durability of the blue colour produced in infusions of gall-nuts, and other powerful astringents. They, however, shew, that the principle on which the colour depends is more soluble in alcohol and in boiling water, than in cold water, and that it is very destructible. It was long believed that cinchona was a powerful astringent; but after Seguin's discovery of gelatine as a test of the principle of astringency, Dr. Maton found that cinchona contained very little tannin. In my experiments, solution of gelatine did not affect the cold infusion, but precipitated the tincture, diluted with water and filtered, slightly, and the filtered decoction copiously. The precipitate in the last case was filamentous, and exactly resembled that produced with gelatine by infusion of galls. Hence it appears that the tannin in cinchona is much less soluble in alcohol and in cold water, than in hot. Dr. Maton discovered, that infusion of cinchona was precipitated by infusion of nut-galls. Seguin, who afterwards made the same observation, concluded from it that cinchona contained gelatine, but erroneously, as I soon after proved. Infusion of galls is precipitated copiously, not only by the filtered decoction of cinchona, but also by the infusion and tincture diluted and filtered; and as these phenomena are inconsistent with the properties of gelatine or starch, (the only other principles which, so far as I know, precipitate infusion of galls), I conceived myself authorized to ascribe them to a vegetable principle, not hitherto examined, soluble in alcohol and in water, and called it Cinchonin. Seguin supposed that it was the tannin of the infusion of galls which formed the precipitate in infusion of cinchona; but this is extremely doubtful; for, as I have mentioned in another work, a decoction of cinchona is precipitated both by gelatine and galls, and when saturated by either of these re-agents, is still acted upon by the other; but an infusion of galls, after being saturated with gelatine, does not act on a decoction of cinchona. "Now, if gelatine deprived the infusion of galls of no other principle but tannin, it would follow, that a decoction of cinchona contains both tannin and a principle precipitable by tannin, which can scarcely be the case; and indeed we do not at present see any way of accounting for the facts, but by supposing that the galls and cinchona contain each of them tannin, and another principle, of a different nature in each, not precipitable by tannin, but by each other." It is satisfactory to find that great master of analysis, Vauquelin, drawing nearly the same conclusion from his observations. "It would seem that it is to the tannin of the oak bark and galls that this principle (cinchonin) unites to form the precipitates observed in the infusions of these substances; but as this principle exists in some species which at the same time precipitate glue, it is doubtful that it really unites to the tannin of the oak bark, or that the principle in the other species of cinchona which precipitate glue, is actually tannin. But the one or the other of these suppositions must be correct, as the infusions of the two species precipitate each other." Dr. Irving obtained from cinchona, a small portion of volatile oil, on which its aroma depends; and Fourcroy and other chemists have observed, that during the evaporation of an infusion or decoction of cinchona, exposed to the air, an insoluble pellicle is formed on the surface. Fabbroni observed, that cinchona loses its solubility by long exposure to the air, and even by being reduced to very fine powder; 100 parts of cinchona, when bruised, yielding from 12 to 16 of extract, and when finely powdered only 6 or 7; and that cinchona destroys the emetic property of tartrate of antimony, without losing its febrifuge virtues.

How little the analysis has hitherto accounted for the virtues of cinchona, is evident from three of the latest writers referring its virtues to totally different principles: Deschamps to the cinchonate of lime, two doses of which, of 36 grains each, according to him cure every intermittent; Westring to the tanning principle; and Seguin, on the contrary, to the principle which precipitates tannin.

Medical use.—On dead animal matter cinchona acts as an antiseptic, and on the living body it acts moreover as a stimulant, tonic, and antispasmodic. The discovery of its medical virtues was, in all probability, the result of accident. In fact, according to some, the Peruvians learned its use by observing certain animals affected with intermittents instinctively led to it; or, according to others, a Peruvian having an ague, was cured by accidentally drinking of a pool which, from some trees having fallen into it, tasted of cinchona : and its use in gangrene is said to have originated from its curing one in an aguish patient. It has had various appellations. About the year 1640, from curing the lady of the Spanish viceroy, the Comitissa del Cinchon, it was called Cortex or Pulvis Commitissæ, Cinchona, &c. ; from the interest which Cardinal de Lugo, and the Jesuit fathers took in its distribution, Cortex or Pulvis Cardinalis de Lugo, Jesuiticus, Patrum, &c.; from the place where it was originally found, Peruvian bark, or simply, from its pre-eminence, Bark.

On its first introduction into Europe, it was reprobated by many eminent physicians; and at different periods long after, it was considered as a dangerous remedy; but its character, in process of time, became universally established.

It was first introduced for the cure of intermittent fevers; and these, when it is properly exhibited, it rarely fails to cure. But there have been considerable differences of opinion with regard to the best mode of exhibition; some prefer giving it just before the fit, some during the fit, others immediately after it. Some, again, order repeated doses between the fits; and this mode of exhibition, although it may perhaps sometimes lead to the employment of more bark than is necessary, upon the whole appears preferable, from being best suited to most stomachs. The requisite quantity is very different in different cases; and in many vernal intermittents cinchona seems even hardly necessary.

It is now given from the very commencement of the disease, without previous evacuations, which, by retarding the cure, often seem to induce abdominal inflammations, scirrhus, jaundice, hectic, dropsy, &c.; symptoms formerly imputed to the premature or immoderate use of the bark, but which are best obviated by its early and liberal use. It is to be continued not only till the paroxysms cease, but till the natural appetite, strength, and complexion return. It is then to be gradually left off, and repeated at proper intervals to secure against a relapse; to which, there often seems to be a peculiar disposition, especially when the wind blows from the east. Although, however, evacuation rather counteracts the effects of cinchona in the cure of intermittents, yet, previous to its use, it is advisable to empty the alimentary canal, particularly the stomach: and on this account good effects are often obtained from premising an emetic.

It is a medicine which seems not only suited to both formed and latent intermittents, but to that state of fibre on which all periodical diseases seem to depend; as periodical pain, inflammation, hæmorrhagy, spasm, cough, loss of external sense, &c.

Cinchona is now used by some in all continued fevers; at the same time attention is paid to keep the bowels clean, and to promote when necessary the evacuation of redundant bile, always, however, so as to weaken the patient as little as possible.

In confluent small-pox, it promotes languid eruption and suppuration, diminishes the fever, and prevents or corrects putrescence and gangrene.

Dr. Haygarth has lately extolled its use in acute rheumatism, from the very commencement, even without premising venesection.

In gangrenous sore throats, and indeed in every species of gangrene, it is much used, both externally and internally.

In contagious dysentery, after due evacuation, it has been used, taken internally and by injection, with and without opium.

In all those hæmorrhagies called passive, and likewise in other increased discharges, it is much used; and in certain undefined cases of hæmoptysis, some allege that it is remarkably effectual when joined with an absorbent.

It is used for obviating the disposition to nervous and convulsive diseases; and some have great confidence in it, joined with sulphuric acid, in cases of phthisis, scrofula, ill-conditioned ulcers, rickets, scurvy, and in states of convalescence. In these cases, it is proper to conjoin it with a milk diet.

In dropsy, not depending on any particular local affection, it is often alternated or conjoined with diuretics or other evacuants, and by its early exhibition after the water is once drawn off, or even begins to be freely discharged, a fresh accumulation is prevented, and a radical cure obtained.

Mr. Pearson of the Lock hospital praises very highly the powers of this remedy in different forms of the venereal disease; in reducing incipient bubo, in cleansing and healing ulcers of the tonsils, and in curing gangrenous ulcers from a venereal cause. But in all these cases mercury must also be given to eradicate the venereal virus from the system.

Peruvian bark may be exhibited,

1. In substance.

The best form of exhibiting this valuable remedy is in the state of a very fine powder, in doses of from ten grains to two drachms and upwards. Mutis and Zea say, that two drachms of true yellow bark in powder are sufficient to prevent the access of an intermittent, while, to produce the same effect, it requires the decoction of two ounces. Nay, even the residuum of an infusion is capable of curing agues, provided it be given in a larger dose than the entire powder. As it cannot be swallowed in the form of a dry powder, it must either be diffused in some liquid, as water, wine, or milk, or mixed with some viscid substance, as currant jelly. Its taste, which is disagreeable to many people, is best avoided by taking it immediately after it is mixed with the vehicle. In this respect, therefore, it is better for the patients to mix it up themselves, than to receive it from the apothecary already made up, into a draught with some simple distilled water, or into an electuary with a syrup. A much more important objection to giving cinchona in substance is, that some stomachs will not bear it, from the oppression, and even vomitting, which in these cases it excites. We must endeavour to obviate this inconvenience by the addition of some aromatic, and by giving it in small doses more frequently repeated. If we are unable to succeed by these means, we must extract the most active constituents of the bark by means of some menstruum. It has therefore long been a pharmaceutical problem to discover which menstruum extracts the virtues of cinchona most completely. But it would be contrary to analogy to suppose, that its constituent principles should subsist so intimately mixed as they must be in an organic product, without exerting upon each other some degree of chemical affinity, and forming combinations possessed of new properties Accordingly we find, whether it arise from this cause, or merely from the state of aggregation, that neither water nor alcohol extract these constituents from cinchona bark in the same quantity in which they are able to dissolve them separately, and that we must have recourse to direct experiment to determine the degree of action possessed by each menstruum upon it. With this view, many experiments have been made, and by very able chemists. But most of them were performed when the science of chemistry was but in its infancy; and even at this time that branch of it which relates to these substances is so little understood, that the results of the latest experiments are far from conclusive.

2. In infusion.

To those whose stomachs will not bear the powder, this is the best form of exhibiting cinchona bark. Water, at a given temperature, seems capable of dissolving only a certain quantity of its active constituents, and therefore we are not able to increase the strength of an infusion, either by employing a larger quantity of the bark, or allowing them to remain longer in contact. One part of bark is sufficient to saturate sixteen of water in the course of an hour or two. To accelerate the action of the water, it is usual to pour it boiling hot upon the bark, to cover it up, and allow it to cool slowly. After standing a sufficient length of time, the infusion is decanted off for use. The propriety of this process may, however, be doubted; for if a cold infusion be boiled, or even gently heated, it acquires a deeper colour, and lets fall a resinous matter, in part insoluble in alcohol and in water. The infusion in water is however liable to one very great objection, that it cannot be kept even a very short time without being decomposed and spoiled. Therefore, in some instances, we prepare the infusion with wine; and it fortunately happens that very often the use of the menstruum is as much indicated as that of the solvend. Cinchona also prevents wine from becoming acid, but in the course of a few days throws down its colouring matter, as nut-galls and charcoal do.

3. In tincture.

The great activity of the menstruum in this preparation, prevents the bark from being given in sufficiently large doses to exert its peculiar virtues. It is, however, a powerful stimulant.

4. In decoction.

Water of the temperature of 212° is capable of dissolving a much larger proportion of the soluble parts of cinchona bark than water at 60°. But the solvent powers even of boiling water have their limits, and by protracting the decoction we do not increase its strength, but rather, by diminishing the quantity of the menstruum, we lessen the quantity of matter dissolved. Besides, at a boiling temperature, some of the active constiuents are dissipated, while others absorb oxygen rapidly from the atmosphere, and are converted into what seems to be an insoluble and inert resinous substance.

5. In extract.

In this preparation, we might expect to possess the virtues of cinchona bark in a very concentrated state. The principal objections to its use are its great expence, and the decomposition and destruction of the active constituents of the bark during the preparation, even when most carefully conducted. Not above half the weight of the dry extract is again soluble in water. It is convenient for the formation of pills and boluses, but we would always prefer a fresh infusion or decoction to any mixture in which the extract is redissolved.

Externally, cinchona bark is used in substance, as an application to ill-conditioned, carious, or gangrenous ulcers.

In the form of clyster it may be given in substance, decoction, or extract. The powder is used as a tooth-powder for spongy and bleeding gums, and the decoction is an excellent astringent gargle or wash.

To increase the power of cinchona bark, or to direct its efficacy to a particular purpose, or to correct some inconveniencies occasionally produced by it, it is frequently combined with other remedies. When it produces vomiting, carbonic acid forms a useful addition; when it purges, opium; when it oppresses the stomach, aromatics; and when it induces costiveness, rhubarb. But we are afraid that many additions are made, chiefly saline substances, of which the effects are not at all understood. Sulphuric acid, super-sulphate of alumina and potass (alum), muriate of ammonia, carbonate of potass, tartrate of potass, tartrate of antimony and potass (tartar emetic), iron, lime-water, astringents, &c. have been frequently prescribed with it; but we know that in many of these mixtures decomposition occurs, which renders the whole either inactive, or completely deceives us with regard to the expected effects.

Officinal Preparations.

Infusum cinchonæ officinalis. *E. D.*
Decoctum chinchonæ officinalis. *E. L. D.*
Tinctura cinchonæ officinalis. *E. L. D.*
——————— composita. *E. L. D.*
——————— ammoniata. *L.*
Extractum cinchonæ officinalis. *E.*
———————— molle. *L. D.*
———————— durum. *L. D.*
———————— cum resina. *L. D.*
Vinum gentianæ compositum. *E.*

Sp. 4. CINCHONA CARIBÆA. *Ed.*

Caribæan Cinchona.

Off.—Cortex. The bark.

THIS tree is found in the Caribæan islands. It grows to a very large size. Dr. Wright, to whom we are indebted for all our knowledge of it, found some in the parish of St. James's, Jamaica, fifty feet high, and proportionally thick. The wood is hard, clouded, and takes a fine polish. The bark of the large trees is rough, the cuticle thick and inert, and the inner bark thinner than that of the young trees, but more fibrous. The bark is brought to us in pieces about a span in length, rolled together, and a line or half a line in thickness, of a brown colour on the surface, which is most commonly covered with white lichens: internally it is of a dark brown colour, and very fibrous in its fracture. It has at first a sweetish taste, but after being chewed some time, it becomes extremely nauseous and bitter. Dr. Wright says he made use of this bark in all cases where Peruvian bark was indicated, and with the greatest success. It has often been confounded with the cinchona floribunda (Willdenow's 7th species), so excellently analysed by Foucroy, under the title of the Cinchona of St. Domingo, and which, taken internally, is apt to excite vomiting and purging.

CISSAMPELOS PAREIRA.

Dioecia Monadelphia.—Nat. ord. *Sarmentaceæ.*
Pareira Brava. Lond.
Pareira brava.

Off.—Radix, the root.

THIS is a perennial climbing plant, which grows in the West-India islands, and in South America. The root, which is officinal, is brought to us from Brazil, in pieces of very different sizes; it is crooked, and variously wrinkled on the surface; outwardly of a dark colour, internally of a dull yellow, and interwoven with woody fibres; so that, upon a transverse section, a number of concentric circles appear, crossed with fibres, which run from the centre to the circumference. It has no smell; the taste is a little bitterish, blended with a sweetness like that of liquorice. Neumann got from 480 parts 123 alcoholic, and 60 watery extract; and inversely, 140 watery, and 66 alcoholic. Nothing rose in distillation.

Medical use.—The root is highly extolled by the Americans and Portuguese, in a great variety of diseases, particularly against suppressions of urine, nephritic pains, and calculus. Geoffroy also found it useful in nephritic disorders, in ulcers of the kidneys and bladder, in humoral asthmas, and in some species of jaundice. The common people of Jamaica use a decoction of the roots for pains and weakness of the stomach proceeding from relaxation. The dose of the root in substance is from twelve grains to half a drachm; in decoction, to two or three drachms.

CISTUS CRETICUS.

Willd. g. 1048. *sp.* 13.—Nat. ord. *Ascyroideæ.*
Ladanum. Lond.
Cretan Cistus. Ladanum.

Off.—Resina. The resin.

THIS is a perennial shrub, which grows in Syria, and more especially in the Grecian islands.

The resin is said to have been formerly collected from the beards of goats which browsed the leaves of the cistus: at present a kind of rake, with several straps or thongs of skins fixed to it, is drawn lightly over the shrub, so as to take up the unctuous juice, which is afterwards scraped off with knives. It is rarely met with pure, even in the places where it is produced; the dust, blown upon the plant by the wind, mingling with the viscid juice, and the inhabitants also being said to mix it with a certain black sand. In the shops two sorts are met with: the best (which is very rare) is in dark-coloured, almost black, masses, of the consistence of a soft plaster, which grows still softer upon being handled; of a very agreeable smell, and of a light, pungent, bitterish taste: the other sort is harder, not so dark-coloured, in long rolls coiled up: this is of a much weaker smell than the first, and has a larger admixture of a fine sand, which in the ladanum examined by the French academy, made up three fourths of the mass; and that found in the shops seems even more sandy. What Neumann examined, however, gave him 5400 alcoholic, and 480 watery; and inversely, 960 watery, and 4960 alcoholic extract, from 7680 parts. In distillation water carries over a volatile oil, and alcohol distilled from it becomes milky on the addition of water.

Officinal Preparations.

Emplastrum ladani compositum. *L.*
——— picis Burgundici. *L.*

CITRUS.

Lin. Syst. Veget. a Murray, g. 901. *Polyadelphia Icosandria.*—Nat. ord. *Pomaceæ.*

Sp. 2. CITRUS AURANTIUM. *Ed.* *Aurantium Hispalense. Lond. Dub.*

Seville orange.

Officinal.

Folium. *L.*	The leaf.
Flos. *L.*	The flower.
Florum aqua stillatitia. *D.*	Orange flower water.
Fructus succus. *L. E. D.*	Orange juice.
——— cortex exterior. *L. E.* Epidermis. *D.*	Orange peel.
——— immaturus. *D.*	Curaçoa oranges.

THE orange tree is a beautiful evergreen, a native of Asia, but now abundantly cultivated in the southern parts of Europe, and in the West-India islands. There are several varieties of this species, but they may be all referred to the bitter or Seville orange, and the sweet or China orange.

The leaves are neither so aromatic nor so bitter as the rind of the fruit.

The flowers (flores naphæ) are highly odoriferous, and have been long in great esteem as a perfume; their taste is somewhat warm, accompanied with a degree of bitterness. They yield their flavour by infusion to rectified spirits, and in distillation both to spirit and water (aqua florum naphæ): the bitter matter is dissolved by water, and on evaporating the decoction, remains entire in the extract.

A very fragrant red-coloured oil, distilled from these flowers, is brought from Italy, under the name of *Oleum*, or *Essentia Neroli;* but oil of behen, in which orange flowers have been digested, is frequently substituted for it: the fraud, however, is easily detected, as the real oil is entirely volatile, and the adulterated is not.

The juice of oranges is a grateful acid liquor, consisting principally of citric acid, syrup, extractive, and mucilage.

The outer yellow rind of the fruit is a grateful aromatic bitter.

The unripe fruit dried are called Curaçoa oranges. They vary in size from that of a pea to that of a cherry. They are bitterer than the rind of ripe oranges, but not so aromatic, and are used as a stomachic.

Medical use.—The leaves have been celebrated by some eminent physicians as a powerful antispasmodic in convulsive disorders, and especially in epilepsy; with others, they have entirely failed. Orange flowers were at one time said to be an useful remedy in convulsive and epileptic cases; but experience has not confirmed the virtues attributed to them. As by drying they lose their virtues, they may be preserved for this purpose by packing them closely in earthen vessels, with half their weight of muriate of soda. The juice of the fruit is of considerable use in febrile or inflammatory distempers, for allaying heat, quenching thirst, and promoting the salutary excretions: it is likewise of use in genuine scorbutus, or sea-scurvy. Although the Seville, or *bitter orange*, as it is called, has alone a place in our Pharmacopœias, yet the China, or sweet orange, is much more employed. Its juice is milder, and less acid; and is very frequently used in its most simple state with great advantage. Dr. Wright applied the roasted pulp as a poultice to fetid sores, in the West Indies, with very great success.

The rind proves an excellent stomachic and carminative, promoting appetite, warming the habit, and strengthening the tone of the viscera. Orange-peel appears to be considerably warmer than that of lemons, and to abound more with essential oil; to this circumstance, therefore, due regard ought to be had in the use of these medicines. The flavour of the former is likewise supposed to be less perishable than that of the latter.

Officinal Preparations.

Of the rind.

Aqua destillata corticis aurantii. *E.*
Conserva corticis aurantii. *E. L. D.*
Syrupus corticis aurantii. *L. D.*
Tinctura corticis aurantii. *L. D.*
Infusum gentianæ compositum. *E. L. D.*
Spiritus raphani compositus. *L. D.*
Tinctura cinchonæ composita. *L. D.*

Of the juice.

Succus cochleariæ compositus. *E. L.*

Sp. 1. CITRUS MEDICA. *Ed.* *Limones. Lond. Dub.*
Lemon tree.

Off.—Fructus succus, cortex exterior, et ejus oleum volatile. The juice and the outer rind of the fruit, and the volatile oil of the outer rind.

THE juice of lemons is analogous to that of oranges, from which it only differs in containing more citric acid and less syrup. The quantity of the former is indeed so great, that the acid has been named from this fruit, Acid of Lemons, and is commonly prepared from it. The simple expressed juice will not keep, on account of the syrup, extractive, mucilage, and water, which cause it to ferment.

The yellow peel is an elegant aromatic, and is frequently employed in stomachic tinctures and infusions: it is considerably less hot than orange peel, and yields in distillation with water a small quantity of essential oil: its flavour is nevertheless more perishable, yet does not arise so readily with spirit of wine; for a spiritous extract made from lemon-peel possesses its aromatic taste and smell in much greater perfection than an extract prepared in the same manner from the orange peel.

Med. use.—Lemon juice is a powerful and agreeable antiseptic. Its powers are much increased, according to Dr. Wright, by saturating it with muriate of soda. This mixture he recommends as possessing very great efficacy in dysentery, remittent fever, the bellyach, putrid sore throat, and as being perfectly specific in diabetes and lienteria. Citric acid is often used with great success for allaying vomiting: with this intention it is mixed with carbonate of potass, from which it expels the carbonic acid with effervescence. This mixture should be drunk as soon as it is made; or the carbonic acid gas, on which the anti-emetic power of this mixture chiefly depends, may be extricated in the stomach itself, by first swallowing the carbonate of potass dissolved in water, and drinking immediately afterwards the citric acrid properly sweetened. The doses are about a scruple of the carbonate dissolved in eight or ten drachms of water, and an ounce of lemon juice, or an equivalent quantity of citric acid.

Lemon juice is also an ingredient in many pleasant refrigerant drinks, which are of very great use in allaying febrile heat and thirst. Of these, the most generally useful is lemonade, or diluted lemon juice, sweetened. Lemonade, with the addition of a certain quantity of any good ardent spirit, forms the well-known beverage punch, which is sometimes given as a cordial to the sick. The German writers order it to be made with arrack, as rum and brandy, they say, are apt to occasion headach. But the fact is directly the reverse, for of all spirits, arrack is most apt to produce headach. The lightest and safest spirits are those which contain least essential oil, or other foreign matters, and which have been kept the longest time after their distillation.

Officinal Preparations.

Of the rind.

Aqua citri medicæ destillata. *E.*
Spiritus ammoniæ compositus. *E. L.*
Infusum gentianæ compositum. *D.*

Of the juice.

Acidum citricum crystallis concretum. *D.*
Succus limonis spissatus. *L.*
Syrupus citri medicæ. *E.*

Of the oil.

Emplastrum aromaticum.
Spiritus ammoniæ aromaticus. *D.*
Unguentum sulphuris. *E.*
———— hellebori. *L.*

COCCUS CACTI. *Ed.* *Coccinella. Lond. Dub.* Cochineal.

Cochineal is the dried body of the female of a hemipterous insect. It is found only in Mexico, on the leaves of the opuntia, or nopal (cactus coccinelliferus). The wild cochineal, which is covered with a silky envelope, is less valuable than the cultivated cochineal, which is without that covering; grows to a larger size, and furnishes a finer and more permanent colour. The Spaniards endeavour to confine both the insect, and the plant on which it feeds, to Mexico. But this attempt at monopoly will, we hope, be frustrated, by the exertions of some gentlemen in the East Indies. The male only is furnished with wings; the female has none, and remains constantly attached to the leaf of the cactus. During winter, the Mexicans preserve these insects, with the succulent leaves to which they are attached, in their houses. In spring, after the rainy season is over, they are transferred to the living plants, and in a few days they lay innumerable eggs, and die. They are collected three times in the year; first, the dead mothers are gathered, as soon as they have laid their eggs; in three or four months, the young, which have grown to a sufficient size, are collected; and in three or four months more, all the young are collected, large and small indiscriminately, except those which they preserve for breeding next year. They are killed by inclosing them in a bag, and dipping them in hot water, and by exposing them, on iron plates, to the heat of the fire. 800,000 pounds are brought annually to Europe; and each pound contains at least 70,000 insects. From their appearance, when brought to us, they were long supposed to be the seed of some plant. They are small, irregular, roundish bodies, of a blackish red colour on the outside, and a bright purple red within. Their taste is acrid, bitterish, and astringent. They are used chiefly for the sake of the fine colour which they produce, and they are principally consumed by the scarlet dyers. In pharmacy, they are employed to give a beautiful red to some tinctures. Their colour is easily extracted, both by alcohol, water, and water of ammonia; and in the dried insect it is not impaired by keeping for any length of time.

Neumann got from 1920 grains, 1440 watery extract; and in another experiment, from the same quantity, 1430 alcoholic. The former was extremely gelatinous.

Medical use.—They have been lately recommended as an anodyne.

Officinal Preparations.

Tinctura aristolochiæ serpentariæ. *E.*
——— cardamomi composita. *L. D.*
——— cantharidis. *L. D.*
——— cinchonæ composita. *E.*
——— gentianæ composita. *L. D.*
——— hellebore nigri. *E. L. D.*
——— rhei. *D.*

COCHLEARIA.

Willd. g. 1228. *Smith, Flor. Brit. g.* 297. *Tetradynamia Siliculosæ.*—Nat. Ord. *Siliquosæ.*

Sp. 1. *Willd. et Smith.* Cochlearia Officinalis. *Ed.*
Cochlearia. Dub. Cochlearia hortensis. Lond.
Common scurvy-grass.

Off.—Herba. The plant.

This is an annual plant, which grows on the sea-shore of the northern countries of Europe, and is sometimes cultivated in gardens. When fresh, it has a peculiar smell, especially when bruised, and a kind of saline acrid taste, which it loses completely by drying, but which it imparts, by distillation, to water or alcohol. It also furnishes an essential oil, the smell of which is extremely pungent.

Medical use.—The fresh plant is a gentle stimulant and diuretic, and is chiefly used for the cure of sea-scury. It may be eaten in substance, in any quantity, or the juice may be expressed from it, or it may be infused in wine or water, or its virtues may be extracted by distillation. The juice is employed as a gargle in sore throat, and scorbutic affections of the gums and mouth.

Officinal Preparations.

Succus cochleariæ compositus. *L E.*
Spiritus raphani compositus. *L. D.*

Sp. 8. *Willd. sp.* 4. *Smith.* Cochlearia Armoracia. *Ed.*
Raphanus rusticanus. Lond. Dub.
Horse-radish.

Off.—Radix. The root.

Horse-radish is perrennial, and sometimes found about river sides, and other moist places; for medicinal and culinary uses, it is cultivated in gardens. It flowers in June, but rarely perfects its seeds in this country. The root has a pungent smell, and a penetrating acrid taste; but it also contains a sweet juice, which sometimes exudes upon the surface. Both water and alcohol extract its virtues by infusion. By drying, it loses all its acrimony, becoming first sweetish, and afterwards almost insipid: if kept in a cool place, covered with sand, it retains its pungency for a considerable time.

3840 parts, according to Neumann, were reduced, by drying, to 1000, and gave of watery extract 480, and 15 of alcoholic; and inversely, 420 alcoholic, and 480 watery; all these extracts were sweetish, without pungency. About 15 of volatile oil, extremely pungent, and heavier than water, arose in distillation with water.

Medical use.—This root is an extremely penetrating stimulus. It excites the solids, and promotes the fluid secretions It has frequently been of service in some kinds of scurvies, and other chronic disorders, supposed to proceed from a viscidity of the juices, or obstructions of the excretory ducts. Sydenham recommends it likewise in dropsies, particularly those which sometimes follow intermittent fevers.

Officinal Preparation.

Spiritus raphani compositus. *L. D.*

COCOS BUTYRACEA. *Ed.*

Palmæ.—Nat. ord. *Palmæ.*

The mackaw tree.

Off.—Nucis oleum fixum. The fixed oil of the nut, commonly called Palm oil.

THIS tree is a native of South America. The fruit is triangular, yellow, and as big as a plum. The nut or kernel yields the oleum palmæ of the shops. It is first slightly roasted and cleaned, and then ground to a paste, first in a mill, and then on al evigating stone. This paste is gently heated, and mixed with $\frac{3}{16}$ its weight of boiling water put into a bag, and the oil expressed between two heated plates of iron. It yields $\frac{7}{16}$ or $\frac{8}{16}$ of oil. If coloured, this oil may be purified by filtration, when melted. It then has the consistence of butter, a golden yellow colour, the smell of violets, and a sweetish taste. When well preserved, it keeps several years without becoming rancid. When spoiled, it loses its yellow colour and pleasant smell. It is said to be often imitated with axunge, coloured with turmeric, and scented with Florentine iris root It is rarely used in medicine, and only externally as an emollient ointment.

COLCHICUM AUTUMNALE. *Ed.*

Willd. g. 707. *sp.* 1. *Smith, Flor. Brit. g.* 187. *sp.* 1. *Hexandria Trigynia.*—Nat. ord. *Liliaceæ.*

Colchicum. Lond. Dub.

Meadow saffron.

Off.—Radix primo vere foliis jam apparentibus. The root in the spring, when the leaves appear.

Meadow Saffron is a perennial bulbous-rooted plant, which grows in wet meadows in the temperate countries of Europe. It flowers in the beginning of autumn, at which time the old bulb begins to decay, and a new bulb to be formed. In the following May, the new bulb is perfected, and the old one wasted and corrugated. It is dug up for medical use in the beginning of summer. The sensible qualities of the fresh root are very various, according to the place of growth, and season of the year. In autumn it is inert; in the beginning of summer, highly acrid. Some have found it to be a corrosive poison; others have eaten it in considerable quantity, without experiencing any effect. When it is possessed of acrimony, this is of the same nature with that of garlic, and is entirely destroyed by drying.

Medical use.—Stork, Collin, and Plenk, have celebrated its virtues as a diuretic in hydrothorax, and other dropsies; but it is, at best, a very uncertain remedy. The expressed juice is used in Alsace to destroy vermin in the hair.

Officinal Preparations.

Syrupus colchici autumnalis. *E.*
Oxymel colchici. *L. D.*

COLOMBA. *Lond. Ed.*
Colombo. Dub.
Colomba.

Off.—Radix. The root.

This is the root of an unknown plant, which, however, is conjectured by Willdenow to be a species of byronia. It was supposed to have its name from a city in Ceylon, from which it is sent over all India. But more recent accounts say, that it is produced in Africa, in the country of the Caffres, and that it forms an important article of commerce with the Portuguese at Mozambique, in the province of Tranquebar. It is generally brought in transverse sections, from half an inch to three inches in diameter, rarely divided horizontally. This is evidently done to facilitate its drying; for the large pieces are all perforated with holes. The bark is wrinkled and thick, of a dark brown colour on the outside, and bright yellow within. The pith in the centre is spongy, yellowish, and slightly striped. Its smell is slightly aromatic, and readily lost when not preserved in close vessels; its taste is unpleasant, bitter, and somewhat acrid; the bark has the strongest taste; the pith is almost mucilaginous. Its essential constituents are cinchonin, and a great deal of mucilage. It is accordingly more soluble in water than in alcohol. The tincture is not precipitated by water, and does not affect the colour of infusion of turnsole, or solution of red sulphate of iron.

Med. use.—In India it is much used in diseases attended with bilious symptoms, particularly in cholera; and it is said to be sometimes very effectual in other cases of vomiting. It often produces excellent effects in dyspepsia. Half a drachm of the powder is given repeatedly in the day.

Officinal Preparation.

Tinctura colombæ. *E. L. D.*

CONIUM MACULATUM. *Ed.*

Willd. g. 533. *sp.* 1. *Smith, Flor. Brit. g.* 130. *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Cicuta. Lond. Dub.

Hemlock.

Off.—Folium, semen, flos. The leaf, flower, and seed.

This is a large biennial umbelliferous plant, which grows very commonly about the sides of fields under hedges, and in moist shady places. As it may be easily confounded with other plants of the same natural order, which are either more virulent, or less active, we shall give a full description of its botanical characters. The root is white, long, of the thickness of a finger, contains, when it is young, a milky juice, and resembles both in size and form the carrot. In spring it is very poisonous, in harvest less so. The stalk is often three, four, and even six feet high, hollow, smooth, not beset with hairs, but marked with red or brown spots. The leaves are large, and have long and thick footstalks; which, at the lower end, assume the form of a groove, and surround the stem. From each side of the footstalk, other footstalks arise, and from these a still smaller order, on which there are sessile, dark-green, shining, lancet-shaped, notched leafits. The umbels are terminal and compound. The flowers consist of five white heart-shaped leaves. The seeds are flat on the one side, and hemispherical on the other, with five serrated ribs. This last circumstance, with the spots on the stalks, and the peculiar very nauseous smell of the plant, somewhat resembling the urine of a cat, serve to distinguish it from all other plants. We must not be misled by its officinal name Cicuta, to confound it with the Cicuta virosa of Linnæus, which is one of the most virulent plants produced in this country, and readily distinguishable from the conium, by having its roots always immersed in water, which those of the conium never are. The possibility of this mistake shews the propriety of denominating all vegetables by their systematic names, as the Edinburgh college now do. The other plants which have been mistaken for the conium maculatum are, the æthusa cynapium, caucalis anthriscus, and several species of chærophyllum, especially the bulbosum, which, however, is not a native of this country.

Hemlock should not be gathered unless its peculiar smell be strong. The leaves should be collected in the month of June, when the plant is in flower. The leafits are to be picked off, and the footstalks thrown away. The leafits are then to be dried quickly in a hot sun, or rather on tin plates before a fire, and preserved in bags of strong brown paper, or powdered and kept in close vessels, excluded from the light; for the light soon dissipates their green colour, and with it the virtues of the medicine.

Med. use.—Fresh hemlock contains not only the narcotic, but also the acrid principle; of the latter much, and of the former little is lost by drying. The whole plant is a virulent poison, but varying very much in strength, according to circumstances. When taken in an over-dose, it produces vertigo, dimness of sight, difficulty of speech, nausea, putrid eructations, anxiety, tremors, and paralysis of the limbs. But Dr. Stoerk found, that in small doses it may be taken with great safety; and that, without at all disordering the constitution, or even producing any sensible operation, it sometimes proves a powerful remedy in many obstinate disorders, In scirrhus, the internal and external use of hemlock has been found useful, but then mercury has been generally used at the same time. In open cancer, it often abates the pain, and is free from the constipating effects of opium. It is likewise used in scrofulous tumours and ulcers, and in other ill-conditioned ulcers. It is also recommended by some in chincough, and various other diseases. Its most common, and best form, is that of the powdered leaves, in the dose at first of two or three grains a-day, which in some cases has been gradually increased to upwards of two ounces a-day. An extract from the seeds is said to produce giddiness sooner than that from the leaves.

Officinal Preparations.

Succus spissatus conii maculati. *E. L. D.*

CONVOLVULUS.

Willd. g. 323. *Pentandria Monogynia.*—Nat. ord. *Companaceæ.*

Sp. 4. CONVOLVULUS SCAMMONIA. *Ed.*
Scammonium. Lond. Dub.
Scammony.

Off.—Gummi-resina. The gum resin.

THE scammony convolvulus is a climbing perennial plant, which grows in Syria, Mysia, and Cappadocia. The roots, which are very long and thick, when fresh, contain a milky juice. This is obtained by removing the earth from the upper part of the roots, and cutting off the tops obliquely. The milky juice which flows out, is collected in a small vessel sunk in the earth at the lower end of the cut. Each root furnishes only a few drachms, but the produce of several roots is added together, and dried in the sun. This is the true and unadulterated scammony. It is light, of a dark-grey colour, but becomes of a whitish yellow when touched with the wet finger, is shining in its fracture, has a peculiar nauseous smell, and bitter acrid taste, and forms with water a greenish milky fluid, without any remarkable sediment. In this state of purity it seldom reaches us, but is commonly mixed with the expressed juice of the root, and even of the stalks and leaves, and often with flour, sand, or earth. The best to be met with in the shops comes from Aleppo, in light spongy masses, having a heavy disagreeable smell, friable, and easily powdered, of a shining ash colour verging to black; when powdered, of a light grey or whitish colour. An inferior sort is brought from Smyrna in more compact ponderous pieces, with less smell, not so friable, and less easily powdered, of a darker colour, not so resinous, and full of sand and other impurities.

Resin is the principal constituent of scammony. Sixteen ounces of good Aleppo scammony, give eleven ounces of resin, and three and a half of watery extract.

Medical use.—Scammony is an efficacious and strong purgatvie. Some have condemned it as unsafe and uncertain, a full dose proving sometimes ineffectual, whilst at others a much smaller dose occasions dangerous hypercatharsis. This difference, however, is owing entirely to the different circumstances of the patient, and not to any ill quality, or irregularity of operation, of the medicine; where the intestines are lined with an excessive load of mucus, the scammony passes through, without acting upon them; but where the natural mucus is deficient, a small dose of this or any other resinous cathartic, irritates and inflames. Many have endeavoured to diminish the activity of this drug, and to correct its imaginary virulence, by exposing it to the fumes of sulphur, dissolving it in acids, and the like; but these only destroy a part of the medicine, without making any alteration in the rest. Scammony in substance, judiciously managed, stands not in need of any corrector: if triturated with sugar, or with almonds, it becomes sufficiently safe and mild in its operation. It may likewise be conveniently dissolved, by trituration, in a strong decoction of liquorice, and the solution then poured off from the feces. The common dose of scammony is from three to twelve grains.

Officinal Preparations.

Electuarium scammonii. *L. D.*
Pulvis scammonii compositus. *E. L.*

Pulvis scammonii cum aloe. *L.*
——————— cum calomelane. *L.*
Extractum colocynthidis compositum. *L. D.*
Pulvis sennæ compositus. *L.*
Pilulæ aloes cum colocynthide. *L.*

Sp. 61. CONVOLULUS JALAPA. *Ed.*
Jalapium. Lond. *Jalapa. Dub.*
Jalap.

Off.—Radix. The root.

JALAP is another climbing perennial species of convolvulus. It is an inhabitant of Mexico and Vera Cruz, from which it was first imported in 1710. It is now cultivated in the botanical garden of Charlestown, and even grows in the stoves at Paris. When recent, the root is white and lactescent; but it is brought to us in thin transverse slices, which are covered with a blackish wrinkled bark, and are of a dark grey colour internally, marked with darker or blackish stripes. It has a nauseous smell and taste; and when swallowed it affects the throat with a sense of heat, and occasions a plentiful discharge of saliva. When powdered it has a yellowish grey colour.

Such pieces should be chosen as are most compact, hard, weighty, dark-coloured, and abound most with dark circular striæ and shining points; the light, whitish, friable, worm-eaten pieces must be rejected.

Slices of briony root are said to be sometimes mixed with those of jalap; but these may be easily distinguished by their whiter colour, and less compact texture.

Neumann got from 7680 parts, 2480 alcoholic, and then by water 1200; and inversely, 2160 watery, besides 360, which precipitated during the evaporation, and 1440 alcoholic: the tincture extracted from 7680 parts, gave by precipitation with water, 1920.

Medical use.—Jalap in substance, taken in a dose of about half a drachm, proves an effectual, and in general a safe, purgative, performing the office mildly, seldom occasioning nausea or gripes. In hypochondriacal disorders, and hot bilious temperaments, it gripes violently, if the jalap be good; but rarely takes due effect as a purge. An extract originally made by water purges almost universally, but weakly; and at the same time has a considerable effect by urine: what remains after this process gripes violently. The pure resin, prepared by alcohol, occasions most violent gripings, and other distressing symptoms, but scarcely proves at all cathartic: triturated with sugar, or with almonds, into the form of an emulsion, or dissolved in spirit, and mixed with syrups, it purges plentifully in a small dose, without occasioning much disorder; the part of the jalap remaining after the separation of the resin, yields to water an extract, which has no effect as a cathartic, but operates powerfully by urine.

Officinal Preparations.

Tinctura convolvuli jalapæ. *E. L. D.*
Extractum convolvuli jalapæ. *E. L. D.*
Pulvis jalapæ compositus. *E.*
Tinctura sennæ compositus. *E.*

COPAIFERA OFFICINALIS.

Willd. g. 880. *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Dumosæ.*

Copaiva tree.

Off.—Resina liquida, *Ed.* Balsamum copaiva, *Lond.* Balsamum copaibæ, *Dub.* The resin. Balsam of copaiva.

The tree which produces this resin is a native of the Spanish West-India islands, and of some parts of South America. It grows to a large size, and the resinous juice flows in considerable quantities from incisions made in the trunk.

The juice is clear and transparent, of a whitish or pale yellowish colour, an agreeable smell, and a bitterish pungent taste. It is usually about the consistence of oil, or a little thicker; when long kept, it becomes nearly as thick as honey, retaining its clearness; but it has not been observed to grow dry or solid, as most of the other resinous juices do. The best resin of copaiva comes from Brazil; but we sometimes meet with a thick sort, which is not at all transparent, or much less so than the foregoing, and generally has a portion of turbid watery liquor at the bottom. This is probably either adulterated by the mixture of other substances, or has been extracted by decoction from the bark and branches of the tree: its smell and taste are much less pleasant than those of the genuine resin.

Pure resin of copaiva dissolves entirely in alcohol: the solution has a very fragrant smell. Distilled with water, it yields a large quantity of a limpid essential oil, but no benzoic acid: it is therefore not a balsam, but a combination of resin and volatile oil. Neumann says that it effervesces with liquid ammonia.

Medical use.—The resin of copaiva is an useful corroborating detergent medicine, but in some degree irritating. It strengthens the nervous system, tends to loosen the belly; in large doses proves purgative, promotes urine, and cleans and heals exulcerations in the urinary passages, which it is supposed to perform more effectually than any of the other resinous fluids. Fuller observes, that it gives the urine an intensely bitter taste, but not a violent smell, as the turpentines do.

This resin has been principally celebrated in gleets, and the fluor albus, and externally as a vulnerary.

The dose of this medicine rarely exceeds 20 or 30 drops, though some authors direct 60, or upwards. It may be conveniently taken in the form of an oleosaccharum, or in that of an emulsion, into which it may be reduced, by triturating it with almonds, with a thick mucilage of gum-arabic, or with the yolk of eggs, till they are well incorporated, and then gradually adding a proper quantity of water.

CORIANDRUM SATIVUM. *Ed.*

Willd. g. 552. *sp.* 1. *Smith, Flor Brit. g.* 142. *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Coriandrum. Lond. Dub.

Coriander.

Off.—Semen. The seeds.

Coriander is an annual, umbelliferous plant, a native of the south of Europe, found wild about Ipswich, and in some parts of Essex, though Dr. Smith does not consider it as indigenous, and differing from all the others of that class, in producing *spherical* seeds. Their smell, when fresh, is strong and disagreeable, but by drying becomes sufficiently grateful. They are recommended as carminative and stomachic.

Officinal Preparations.

Infusum sennæ tartarisatum. *L.*
——— tamarindi et sennæ. *E.*
Tinctura sennæ composita. *E.*
Electuarium sennæ. *E. L.*
Aqua calcis composita. *D.*

CROCUS SATIVUS. *Ed.*

Willd. g. 92. *sp.* 1. *Smith, Flor. Brit. g.* 16. *sp.* 1. *Triandria Monogynia.*—Nat. ord. *Liliaceæ.*

Crocus. Lond. Dub.

Saffron crocus.

Off.—Floris stigma, *Crocus* dictum. The summits of the pistils, called Saffron.

Crocus is a bulbous-rooted perennial plant, probably a native of the East, although it is now found wild in England, and other temperate countries of Europe. It is very generally cultivated as an ornament to our gardens, and in some places for the saffron, which is formed of the dried summits of the pistil. Each flower has one pistil, the summit of which is deeply divided into three slips, which are of a dark orange-red colour, verging to white at the base, and are smooth and shining. Their smell is pleasant and aromatic, but narcotic; their taste a fine aromatic bitter, and they immediately give a deep yellow colour to the saliva when chewed. The flowers are gathered early in the morning, just before they open; the summits of the pistils are picked out, very carefully dried by the heat of a stove, and compressed into firm cakes. The English saffron is superior to what is imported from other countries, and may be distinguished by its blades being broader. On the continent, they reckon the Austrian and the French from Gatinois the best. The Spanish is rendered useless by being dipt in oil, with the intention of preserving it. Saffron should be chosen fresh, not above a year old, in close cakes, neither dry, nor yet very moist; tough and firm in tearing; difficultly pulverizable; of a fiery orange-red colour, within as well as without; of a strong, acrid, diffusive smell; and capable of colouring a very large proportion of water or alcohol. Saffron which does not colour the fingers when rubbed between them, or stains them with oil, has little smell or taste, or a musty or foreign flavour, is too tender, and has a whitish, yellow, or blackish colour, is bad. It is said that it is sometimes adulterated with the fibres of smoked beef, and with the flowers the carthamus tinctorius, calendula officinalis, &c. The imposition may be detected by the absence of the white ends, which may be observed in the real saffron, by the inferior colouring power, and by the want of smell, or an unpleasant smell, when thrown on live coals.

By distillation with water, saffron furnishes a small proportion of essential oil, of a golden yellow colour, heavier than water, and possessing the characteristic smell in an eminent degree. According to Hermbstaedt, the soluble matter of saffron is extractive nearly pure. Neumann obtained from 480 dried saffron 360 grains of watery extract which was soluble in alcohol, except 24 of a colourless matter like sand, and afterwards 20 of alcoholic; and inversely, 320 of alcoholic extract entirely soluble in water, and then 90 of watery.

On account of the great volatility of the aromatic part of the saffron, it should be wrapt up in bladder, and preserved in a box or tin case.

Medical use.—Saffron is a very elegant aromatic: besides the virtues which it has in common with all the bodies of that class, it has been alleged that it raises the spirits, and in large doses occasions immoderate mirth, involuntary laughter, and the other effects which follow from the abuse of spiritous liquors. It is said to be particularly serviceable in hysteric depressions, or obstructions of the uterine secretions, where other aromatics, even those of the more generous kind, have little effect. But the experiments of Dr. Alexander and Dr. H. Cullen shew, that it is much less powerful than was once imagined: so that of late the estimation in which it was held as a medicine has been on the decline.

Officinal Preparations.

Syrupus croci. *L. D.*
Tinctura croci Anglici. *E.*
Confectio aromatica. *L.*
Electuarium aromaticum. *D.*
Pilulæ aloes cum myrrha. *L.*
Tinctura aloes etherea. *L.*
———— cum myrrha. *E. L. D.*
———— cinchonæ composita. *L. D.*
———— rhabarbari. *L.*
———— composita. *L.*
Vinum rhabarbari. *L.*

CROTON ELEUTHERIA. *Swartz. prod. Ed. Croton Cascarilla. Dub.*

Clutia Eleutheria. Murray. g. 1140. *sp.* 7. *Monoecia Adelphia.*—Nat. ord. *Tricoccæ.*

Eleutheria, or Cascarilla.

Off.—Cortex. The bark.

THIS bark is imported into Europe from the Bahama islands, and particularly from one of them of the name of Eleutheria; from which its trivial name is derived. But Dr. Wright also found the tree on the sea-shore in Jamaica, where it is common, and rises to about twenty feet in height. It is the Clutia eluteria of Linnæus: the bark of whose Croton cascarilla has none of the sensible qualities of the cascarilla of the shops.

This bark is in general imported either in curled pieces or rolled up into short quills, about an inch in width, somewhat resembling in appearance the Peruvian bark. Its fracture is smooth, and close, of a dark brown colour. It is covered with a rough whitish epidermis; and in the inside it is of a brownish cast.

It has a light agreeable smell, and a moderately bitter taste, with some aromatic warmth. It burns readily, and yields, when burning, a very fragrant smell, resembling that of musk; a property which distinguishes the cascarilla from all other barks.

Its active constituents are aromatic volatile oil and bitter extractive. Its virtues are partially extracted by water, and totally by alcohol; but it is most effectual when given in substance.

Medical use.—It produces a sense of heat, and excites the action of the stomach; and it is therefore a good and pleasant stomachic, and may be employed with advantage in flatulent colics, internal hæmorrhagies, dysenteries, diarrhœas, and similar disorders.

As the essential oil is dissipated in making the extract, this preparation acts as a simple bitter. It was much employed by the Stahlians in intermittent fever, from their fear of using Cinchona bark, to which, however, it is much inferior in efficacy.

Officinal Preparations.

Tinctura cascarillæ. *L. D.*
Extractum cascarillæ. *L. D.*

CUCUMIS COLOCYNTHIS. *Ed.*

Monoecia Syngenesia.—Nat. ord. *Cucurbitaceæ.* *Murray, g.* 1092. *sp.* 1.

Colocynthis. Lond. Dub.

Coloquintida, or bitter apple.

Fructus, cortice seminibusque abjectis. *Ed.* Fructus medulla. *Lond. Dub.* The medullary part of the fruit.

This is an annual plant of the gourd kind, a native of Turkey. The fruit is about the size of an orange; its medullary part, freed from the rind and seeds, is alone made use of in medicine; this is very light, white, spongy, composed of membranous leaves, of an extremely bitter, nauseous, acrimonious taste. It is gathered in autumn when it begins to turn yellow, and is then peeled and dried quickly, either in a stove or in the sun. In the latter case it should be covered with paper.

Neumann got from 7680 parts 1680 alcoholic extract, and then 2160 watery; and inversely, 3600 watery, and 224 alcoholic.

Medical use.—Colocynth is one of the most powerful and most violent cathartics. Many eminent physicians condemn it as dangerous, and even deleterious: others recommend it not only as an efficacious purgative, but likewise as an alterative in obstinate chronical disorders. It is certain that colocynth, in the dose of a few grains, acts with great vehemence, disorders the body, and sometimes occasions a discharge of blood. Many attempts have been made to correct its virulence by the addition of acids, astringents, and the like: these may lessen the force of the colocynth, but no otherwise than might be equally done by a reduction of the dose. The best method of abating its virulence, without diminishing its purgative virtue, seems to be by triturating it with gummy farinaceous substances, or the oily seeds.

Officinal Preparations.

Extractum colocynthidis compositum. *L. D.*
Pilulæ aloes cum colocynthide. *E. D.*

CUMINUM CYMINUM.

Willd. g. 547. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Umbellatæ.*

Cuminum. Lond.

Cummin.

Off.—Semen. The seeds.

The cummin is an annual umbelliferous plant, in appearance resembling fennel, but much smaller. It is a native of Egypt; but the seeds used in Britain are brought chiefly from Sicily and Malta. Cummin seeds have a bitterish warm taste, accompanied with an aromatic flavour, not of the most agreeable kind, residing in a volatile oil.

Officinal Preparations.

Cataplasma cumini. *L.*
Emplastrum cumini. *L.*

CUPRUM. *Lond. Ed. Dub.*

Copper.

Copper is found in many countries.

a. In its metallic state:
1. Crystallized.
2. Alloyed with arsenic and iron.
3. Sulphuretted.

b. Oxidized:
4. Uncombined.
5. Combined with carbonic acid.
6. ———————— sulphuric acid.
7. ———————— arsenic acid.

The general properties of copper have been already enumerated.

Copper has more smell and taste than almost any other metal. Its effects, when taken into the stomach, are highly deleterious, and often fatal. It particularly affects the primæ viæ, exciting excessive nausea, vomiting, colic pains, and purging, sometimes of blood, or, though more rarely, obstinate constipation. It also produces agitation of the mind, headach, vertigo, delirium; renders the pulse small and weak, the countenance pale, and causes fainting, convulsions, paralysis, and apoplexy. When any of these symptoms occur, we must endeavour to obviate the action of the poison by large and copious draughts of oily and mucilaginous liquors, or to destroy its virulence by solutions of potass, or sulphuret of potass.

Poisoning from copper is most commonly the effect of ignorance, accident, or carelessness; and too many examples are met with of fatal consequences ensuing from eating food which had beeen dressed in copper vessels not well cleaned from the rust which they had contracted by being exposed to the action of air and moisture; or pickles, to which a beautiful green colour had been given, according to the murderous directions of the most popular cookery books, by boiling them with halfpence, or allowing them to stand in a brass pan until a sufficient quantity of verdegris was formed.

Great care ought to be taken that acid liquors, or even water, designed for internal use, be not suffered to stand long in vessels made of copper, otherwise they will dissolve so much of the metal as will give them dangerous properties. But the sure preventive of these accidents is to banish copper utensils from the kitchen and laboratory. The presence of copper in any suspected liquor is easily detected by inserting into it a piece of polished steel, which will soon be coated with copper, or by dropping into it some carbonate of ammonia, which will produce a beautiful blue colour if any copper be present.

But although copper be thus dangerous, some preparations of it are in certain cases used with great advantage both externally and internally.

The chief of these are,

1. The sub acetate of copper.
2. The sulphate of copper.
3. The sub-sulphate of copper and ammonia.
4. The muriate of copper and ammonia.
5. A solution of the sulphate of copper and super-sulphate of alumina in sulphuric acid.

As the two first of these are never prepared by the apothecary, but bought by him from the manufacturer, they are inserted in the list of materia medica.

SUBACETAS CUPRI. *Dub.* *Subacetas cupri impura. Lond.*

Off.—Subacetis cupri. *Ed.* Ærugo. *Lond. Dub.*

Sub-acetate of copper. Verdigris.

THE preparation of this substance was almost confined to Montpelier in France, owing chiefly to an excellent regulation which existed, that no verdigris could be sold until it had been examined and found of sufficiently good quality. For since that regulation has been abolished, Chaptal informs us, that so many abuses have crept into the manufacture, that the Montpelier verdigris has lost its decided superiority of character. It is prepared by stratifying copper plates with the husks and stalks of the grape, which have been made to ferment after the wine has been expressed from them. In from ten to twenty days, when the husks become white, the plates of copper are taken out, and their surfaces are found to be covered with detached

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When preparing this sheet for the press, I received the New London Pharmacopœia, and Dr. Powell's excellent translation of it. The subsequent sheets are accordingly accommodated to the New Pharmacopœia, while the preceding necessarily refer to the former edition The uniformity of this Dispensatory has been thus unavoidably injured, but its utility infinitely increased.

and silky crystals. They are now placed on edge, with their surfaces in contact, in the corner of a cellar, and alternately dipt in water, and replaced to dry every seven or eight days, for six or eight times. By this management the plates swell, and are everywhere covered with a coat of verdigris, which is easily separated with a knife. In this state it is only a paste, and is sold by the manufacturers to commissioners, who beat it well with wooden mallets, and pack it up in bags of white leather, a foot high, and ten inches wide, in which it is dried by exposing it to the air and sun, until the loaf of verdigris cannot be pierced with the point of a knife.

Sub-acetate of copper should be of a bluish-green colour, dry and difficult to break, and should neither deliquesce, have a salt taste, contain any black or white spots, nor be adulterated with earth or gypsum. Its purity may be tried by diluted sulphuric acid, in which the sub-acetate dissolves entirely, and the impurities remain behind.

Verdigris, as it comes to us, is generally mingled with stalks of the grape; they may be separated, in pulverization, by discontinuing the operation, as soon as what remains seems to be almost entirely composed of them.

Medical use.—Verdigris is seldom or never used internally. Some writers highly extol it as an emetic, and say, that a grain or two act as soon as received into the stomach; but its use has been too often followed by dangerous consequences to allow of its employment. Verdigris, applied externally, proves a gentle detergent and escharotic, and is employed to destroy callous edges, or fungous flesh in wounds. It is also advantageously applied to scorbutic ulcers of the mouth, tongue, or fauces, and deserves to be carefully tried in cancerous sores.

SULPHAS CUPRI. *Ed. Dub. Lond.*
Sulphate of copper. Blue vitriol.

THIS metallic salt is rarely formed by combining directly its component parts; but it is obtained, either by evaporating mineral waters which contain it, or by acidifying native sulphuretted copper, by exposing it to the action of air and moisture, or by burning its sulphur.

When pure it has a deep blue colour, and is crystallized generally in long rhomboids. It effloresces slightly in the air, is soluble in four parts of water at 60°, and in two at 212°, and is insoluble in alcohol. By heat it loses, first its water of crystallization, and afterwards all its acid. It is decomposed by the alkalies and earths, and some of the metals, the alkaline carbonates, borates, and phosphates, and some metallic salts.

It is composed of,

$$\left.\begin{array}{lr}\text{Copper,} & 24\\ \text{Oxygen,} & 8\\ \text{Water,} & 10\end{array}\right\}\ 42\ \text{hydro-oxide of copper,}$$

33 sulphuric acid.
25 water of crystallization,

100

Medical use.—The sulphate of copper has a strong, styptic, metallic taste, and is chiefly used externally as an escharotic for destroying warts, callous edges, and fungous excrescences, as a stimulant application to ill-conditioned ulcers, and as a styptic to bleeding surfaces. Taken internally, it operates, in very small doses, as a very powerful emetic. It has, however, been exhibited in incipient phthisis pulmonalis, intermittent fever, and epilepsy; but its use is not free from danger.

CYNARA SCOLYMUS. *Ed.*

Willd. g. 1436. *sp.* 2. *Syngenesia Polygamia æqualis.*—Nat. ord. *Compositæ capitatæ.*

Artichoke.

Off.—Folium. The leaves.

The artichoke is a perennial plant, indigenous in the south of Europe, but very frequently cultivated in our gardens for culinary purposes.

The leaves are bitter, and afford, by expression, a considerable quantity of juice, which is said to be diuretic, and to have been successfully used in dropsy.

DAPHNE MEZEREUM. *Ed. Lond. Dub.*

Willd. g. 773. *sp.* 1. *Smith, Flor. Brit. g.* 194. *sp.* 1. *Octandria Monogynia.*—Nat. ord. *Veprecula.*

Mezereon, spurge olive.

Off.—Daphnes mezerei radicis cortex. *Ed.*
Mezerei cortex. *Lond. Dub.*
The bark of the root.

Mezereon is a shrub which grows in woody situations in the northern parts of Europe, and is admitted into our gardens from its flowering in winter. The bark, which is taken from the trunk, larger branches, and root, is thin, striped, reddish, commonly covered with a brown cuticle, has no smell, and when chewed, excites an insupportable sensation of burning in the mouth and throat. When applied to the skin in its recent state, or infused in vinegar, it raises blisters.

Medical use.—The root was long used in the Lisbon diet-drink, for venereal complaints, particularly nodes, and other symptoms resisting the use of mercury. The bark of the root contains most acrimony, though some prefer the woody part. Mezereon has also been used with good effects in tumours and cutaneous eruptions not venereal.

Dr. Cullen says that it acts upon the urine, sometimes giving it a filamentous appearance, and upon the perspiration, without diminishing the strength remarkably; and that, in irritable habits, it quickens the pulse, and increases the heat of the whole body. But Mr. Pearson of the Lock hospital asserts, that excepting a case or two of lepra, in which a decoction of this plant conferred temporary benefit, he very seldom found it possessed of medical virtues, either in syphilis, or in the sequelæ of that disease. In scrofula, or in cutaneous affections, it is employed chiefly under the form of decoction; but it has also been used in powder; and as it is apt to occasion vomiting and purging, it must be begun in grain doses, and gradually increased. It is often combined with mercury.

The berries are still more acrid than the bark, and they have even been known to produce fatal effects on children, who have been tempted by their beauty to eat them. It is said that they are sometimes infused in vinegar, to make it more pungent and appear stronger.

DATURA STRAMONIUM. *Ed. Dub.*

Willd. g. 377. *sp.* 1. *Smith, Flor. Brit. g.* 98. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Thorn-apple. James-town weed.

Off.—Herba daturæ stramonii. *Ed.*
Herba stramonii. *Dub.*
The plant.

The thorn-apple is an annual plant, a native of America, gradually diffusing itself from the south to the north, and now even growing wild on dry hills and uncultivated places in England, and other parts of Europe. The leaves are dark green, sessile, large, egg-shaped, pointed, angular, and deeply indented, of a disagreeable smell and nauseous taste. Every part of the plant is a strong narcotic poison, producing vertigo, torpor, death Dr. Barton mentions the cases of two British soldiers, who eat it, by mistake, for the Chenopodium album: one became furious, and ran about like a madman, and the other died, with the symptoms of genuine tetanus. The best antidote to its effects is said to be vinegar.

Medical use.—Dr. Stork first tried it as a remedy in mania and melancholy, with considerable success. Several cases of the same diseases were also cured or relieved by it, under the direction of different Swedish physicians. Dr. Barton considers it to be a medicine of great efficacy; and although, with others, it has frequently failed, it deserves the attention of practitioners, and well merits a trial, in affections often incurable by other means. It has also been employed, and sometimes with advantage, in convulsive and epileptic affections. An ointment prepared from the leaves has been said to give ease in external inflammations and hæmorrhoids. The inspissated juice of the leaves has been most commonly used; but its exhibition requires the greatest caution. At first, a quarter of a grain is a sufficient dose. Dr. Barton gives it in powder, beginning with doses of a few grains, and increasing them, in a few days, to 15 or 20. In a case, in which it was exhibited to the extent of 30 grains, it dilated the pupil of one eye, and produced paralysis of the eye-lids, which was removed by a blister · and the bruised leaves, according to Plenk, soften hard and inflamed tumours, and discuss tumours in the breasts of nurses, from indurated milk.

Hufeland gave it in the form of a tincture, prepared of two ounces of the seeds in four ounces of wine, and one of diluted alcohol, in diseases of the mind.

DAUCUS CAROTA. *Ed. Lond. Dub.*

Willd. g. 530. *sp.* 1. *Smith, g.* 128. *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Carrot.

Off.—Dauci carota semen. *Ed.*
Dauci sylvestris semina. *Dub.*
Dauci (agrestis) semina. *Lond.*
Dauci (hortensis) radix. *Lond.*
The seeds of the wild, and root of the garden carrot.

THIS is a biennial plant, which grows wild in Britain, and is cultivated in great quantities as an article of food. The seeds, especially of the wild variety, have a moderately warm pungent taste, and an agreeable aromatic smell. They are carminative, and are said to be diuretic. The roots, especially of the cultivated variety, contain much mucilaginous and saccharine matter, and are therefore highly nutritious and emollient. When beaten to a pulp, they form an excellent application to carcinomatous and ill-conditioned ulcers, allaying the pain, checking the suppuration and fetid smell, and softening the callous edges.

DELPHINIUM STAPHISAGRIA. *Lond. Dub.*

Willd. g. 1061. *sp.* 13. *Polyandria Trigynia.*—Nat. ord. *Multisiliquæ.*

Stavesacre.

Off.—Staphisagriæ semina. *Lond. Dub.*
The seed.

STAVESACRE is a biennial plant, a native of the south of Europe. The seeds are usually brought from Italy. They are large and rough, of an irregular triangular figure, of a blackish colour on the outside, and yellowish or whitish within; they have a disagreeable smell, and a very nauseous, bitterish, burning taste.

Neumann got from 480 parts, 45 alcoholic extract, besides 90 of fixed oil, which separated during the process, and afterwards 44 insipid watery, and inversely, 95 watery, and then by alcohol only one, besides 71 of oil.

Med. use.—Stavesacre was employed by the ancients as a cathartic; but operates with so much violence, both upwards and downwards, that its internal use has been for some time almost laid aside. It is chiefly employed in external applications for some kinds of cutaneous eruptions, and for destroying lice and other insects; insomuch, that from this virtue it has received its name in different languages.

DIANTHUS CARYOPHYLLUS. *Ed. Dub.*

Willd. g. 893. *sp.* 9. *Smith, g.* 209. *sp.* 3. *Decandria Digynia.*—Nat. ord. *Caryophyllæ.*

Clove Gilly-flower. Clove pink, or carnation.

Off.—Dianthi caryophylli flos. *Ed.*
Cary ophylli rubri flores. *Dub.*
The flowers.

THIS species of dianthus is perennial, and is a native of Italy, though now found wild on the walls of old castles in England. By cultivation, its varieties have increased to a very great number, and they form one of the greatest ornaments of our gardens. Most of these are termed Carnations; but the variety which is officinal surpasses all the others in the richness of its smell. It is also distinguished by being of an uniform deep crimson colour, and having the edges of its petals entire, not crenated as the others. It is now scarcely, if at all, to be found in Scotland; and, instead of it, the crimson carnations are commonly used to give the colour to the syrup, while for its flavour it is indebted to the spice clove. Their only use in pharmacy is to give a pleasant flavour and beautiful colour to an officinal syrup.

DIGITALIS PURPUREA. *Ed. Lond. Dub.*

Willd. g. 1155. *sp.* 1. *Didynamia Angiospermia.*—Nat. ord. *Solanaceæ.*

Foxglove.

Off.—Digitalis purpureæ folium. *Ed.*
Digitalis folia. *Lond. Dub.*
The leaves.

This is an indigenous biennial plant, very common on hedge-banks, and sides of hills, in dry, gravelly, or sandy soils, and the beauty of its appearance has gained it a place in our gardens and shrubberies. The leaves are large, oblong, egg-shaped, soft, covered with hairs, and serrated. They have a bitter, very nauseous taste, with some acrimony.

Medical use.—Its effects, when taken into the stomach, are,

1. To diminish the frequency of the pulse.
2. To diminish the irritability of the system.
3. To increase the action of the absorbents.
4. To increase the discharge by urine.

In excessive doses, it produces vomiting, purging, dimness of sight, vertigo, delirium, hiccough, convulsions, collapse, death. For these symptoms, the best remedies are cordials and stimulants.

Internally, digitalis has been recommend,

1. In inflammatory diseases, from its very remarkable power of diminishing the velocity of the circulation.

2. In active hæmorrhagies, in phthisis.

3. In some spasmodic affections, as in spasmodic asthma, palpitation, &c.

4. In mania from effusion on the brain.

5. In anasarcous and dropsical effusions.

6. In scrofulous tumours.

7. In aneurism of the aorta, and palpitation, I have seen it alleviate the most distressing symptoms.

Externally, it has been applied to scrofulous tumours.

It may be exhibited,

1. In substance, either by itself, or conjoined with some aromatic, or made into pills, with soap or gum ammoniac. Withering directs the leaves to be gathered after the flowering stem has shot up, and about the time when the blossoms are coming forth. He rejects the leaf stalk, and middle rib of the leaves, and dries the remaining part, either in the sunshine, or before the fire. In this state, they are easily reduced to a beautiful green powder, of which we may give, at first, one grain twice a-day, and gradually increase the dose until it act upon the kidneys, stomach, pulse, or bowels, when its use must be laid aside, or suspended.

2. In infusion. The same author directs a drachm of the dried leaves to be infused for four hours in eight ounces of boiling water, and an ounce of any spiritous water to be added to the strained liquor, for its preservation. Half an ounce, or an ounce of this infusion may be given twice a-day.

3. In decoction. Darwin directs that four ounces of the fresh leaves be boiled from two pounds of water to one, and that half

an ounce of the strained decoction be taken every two hours, for four or more doses.

4. In tincture. Put one ounce of the dried leaves, coarsely powdered, into four ounces of diluted alcohol; let the mixture stand by the fire-side twenty-four hours, frequently shaking the bottle; and the saturated tincture, as Darwin calls it, must then be separated from the residuum, by straining or decantation. Twenty drops of this tincture may be taken twice or thrice a-day. The Edinburgh college use eight ounces of diluted alcohol to one of the powder, but let it digest seven days.

5. The expressed juice and extract are not proper forms of exhibiting this very active remedy.

When the digitalis is disposed to excite looseness, opium may be advantageously conjoined with it; and when the bowels are tardy, jalap may be given at the same time, without interfering with its diuretic effects. During its operation in this way, the patient should drink very freely. Two cases of phthisis are related by Dr. Gregg, in which it produced a copious ptyalism.

DOLICHOS PRURIENS. *Ed. Lond. Dub.*

Murray, *g.* 867. *sp.* 11. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Cow-itch.

Off.—Dolichi prurientis leguminis pubes rigida. *Ed.*
Dolichi pubes. *Lond.*
Dolichi setæ leguminum. *Dub.*
The stiff hairs which cover the pods.

The dolichos is a climbing plant growing in great abundance in warm climates, particularly in the West Indies. The pods are about four inches long, round, and as thick as a man's finger. On the outside they are thickly beset with stiff brown hairs, which, when applied to the skin, occasion a most intolerable itching.

Med. use.—The ripe pods are dipped in syrup, which is again scraped off with a knife. When the syrup is rendered by the hairs as thick as honey, it is fit for use. It acts mechanically as an anthelmintic, occasions no uneasiness in the primæ viæ, and may be safely taken, from a tea-spoonful to a table-spoonful in the morning, fasting. The worms are said to appear with the second or third dose; and by means of a purge, in some cases the stools have consisted entirely of worms.

DORSTENIA CONTRAJERVA. *Ed. Lond.*

Willd. g. 244. *sp.* 5. *Tetrandria Monogynia.*—Nat. ord. *Scabridæ.*

Contrayerva.

Off.—Dorsteniæ contrajervæ radix. *Ed.*
Contrajervæ radix. *Lond.*
The root.

THIS plant is perennial, and grows in South America, and some of the Caribæan islands.

The root is knotty, an inch or two long, and about half an inch thick, of a reddish brown colour externally, and pale within: long, rough, slender fibres shoot out from all sides of it; and are generally loaded with small round knots. It has a peculiar kind of aromatic smell, and a somewhat astringent, warm, bitterish taste, with a light and sweetish kind of acrimony, when long chewed: the fibres have little taste or smell; the tuberous part, therefore, should be alone chosen.

This root contains so much mucilage, that a decoction of it will not pass through the filter. Neumann got from 480 parts, 190 watery extract, and afterwards with alcohol 7, and inversely, 102 alcoholic, and 60 watery. I find that the tincture reddens infusion of lithmus, is precipitated by water, and has no effect on the salts of iron.

Medical use.—Contrayerva is a gentle stimulant and diaphoretic, and is sometimes given in exanthematous diseases, typhus, and dysentery. Its dose is about half a drachm.

ERYNGIUM MARITIMUM. *Dub.*

Willd. g. 518. *sp.* 6. *Smith, g.* 121. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Umbellatæ.*

Sea-eryngo. Sea-holly.

Off.—Eryngii radix.
The root.

THIS plant grows plentifully on some of our sandy and gravelly shores. It is perennial, and flowers in July and August. The roots are slender and very long; of a pleasant sweetish taste, which, on chewing them for some time, is followed by a light degree of aromatic warmth and acrimony. They are accounted aperient and diuretic, and have also been celebrated as aphrodisiac; their virtues, however, are too weak to admit them under the head of medicines.

EUGENIA CARYOPHYLLATA. *Dub. Lond.*

Willd. g. 972. *sp.* 24. *Icosandria Monogynia.*—Nat. ord. *Hesperideæ.*

The clove tree.

Off.—Caryophylli aromatici floris germen. *Ed.* Caryophylli. *Lond.* Caryophylli aromaticæ calyx. *Dub.*
Caryophylli aromatici oleum volatile. *Ed.* Caryophylli

oleum. *Lond.* Caryophylli aromaticæ oleum essentiale. *Dub.*

The calyx, flower-bud and its essential oil.

This is a beautiful tall tree, a native of the Molucca islands. The Dutch, from a desire of monopolizing the valuable spice produced by it, destroyed all the trees except in Amboyna, where it is carefully cultivated. But their scheme has been frustrated, and the clove is now thriving in the isle of France and other places. Every part of this tree is highly aromatic, especially the leaf-stalk. Cloves are the flower-buds, which are gathered in October and November, before they open, and when they are still green, and are dried in the sun, after having been exposed to smoke for some days.

Cloves have somewhat the form of a nail, consisting of a globular head, formed of the four petals of the corolla, and four leaves of the calyx not yet expanded; (but this part is often wanting, being easily broken off), and a germen situated below, nearly round, but somewhat narrower towards the bottom, scarcely an inch in length, and covered with another thicker calyx, divided above into four parts. Their colour should be of a deep brown, their smell strong, peculiar, and grateful; their taste acrid, aromatic, and permanent. The best cloves are also large, heavy, brittle, and when pressed with the nail, exude a little oil. When light, soft, wrinkled, dirty, pale, and without smell or taste, they are to be rejected.

The Dutch, from whom we have this spice, frequently mix it with cloves from which the oil has been distilled. These, though in time they regain from the others a considerable share both of taste and smell, are easily distinguishable by their weaker flavour and lighter colour.

Cloves yield by distillation with water about one seventh of their weight of volatile oil; 960 parts also gave to Neumann 380 of a nauseous, somewhat astringent, watery extract. The same quantity gave only 300 of excessively fiery alcoholic extract. When the alcoholic extract is freed from the volatile oil by distillation with water, the oil that arises proves mild, and the resin that remains insipid. Its pungency therefore seems to depend on the combination of these principles. The Dutch oil of cloves is extremely hot and fiery, and of a reddish brown colour, but it is greatly adulterated, both with fixed oils and resin of cloves; for the genuine oil, when recently distilled, is comparatively quite mild and colourless, although it gradually acquires a yellow colour. It is heavier than water, and rises in distillation with some difficulty, so that it is proper to use a very low-headed still, and to return the distilled water several times upon the residuum.

Medical use.—Cloves, considered as medicines, are very hot stimulating aromatics, and possess in an eminent degree the general virtues of substances of this class.

FERRUM. *Lond. Dub. Ed.*
Iron.

This is the most common of all metals. It seems even to be a constituent of organic substances, and is the only metal which, when taken into the body, exerts no deleterious action upon it. The numerous ores of it which are found in every part of the globe, may be reduced to the following genera.

1. Native iron. Immense isolated masses of this have been found in Siberia and in South America. Their origin is still perfectly problematical.
2. Carburetted iron. Plumbago.
3. Sulphuretted iron. Pyrites.
4. Oxidized iron.
   - *a.* Protoxide. Magnetic iron ore; colour black or grey.
   - *b.* Peroxide. Not magnetic; colour red or brown.
   - *c.* Carbonated.
   - *d.* Arseniated.
   - *e.* Tungstated.

The properties of iron, when obtained from any of these ores by the usual processes of fusion, &c. have been already described. As its mechanical division is extremely difficult, it is directed to be kept in the shops in the state of filings or wire, and the scales of black oxide, which are found around the smith's anvil. Soft malleable iron is the only kind fit for internal use, as steel and cast-iron always contain impurities, and often arsenic.

Iron is prescribed,

I. In its metallic state.
   - Ferri limatura. *Ed.*
   - ——————— purificata. *Ed.*
   - Ferri ramenta et fila. *Lond.*
   - Ferri scobs. *Dub.*

II. Oxidized.
   1. Protoxide.
      - Ferri squamæ. *Ed.*
      - Ferri oxydi squamæ. *Dub.*
         - Oxidum ferri nigrum purificatum. *Ed.*
         - Oxydum ferri nigrum. *Dub.*
   2. Peroxide.
      - Oxidum ferri rubrum. *Ed. Dub.*
   3. Supercarbonated; as in the chalybeate mineral waters.
   4. Carbonated.
      - *a.* Carbonas ferri præparatus. *Ed.*

Ferri rubigo. *Dub.*
b. Carbonas ferri præcipitatus. *Ed.*
Carbonas ferri. *Lond. Dub.*
5. Sulphated.
Sulphas ferri *Ed. Lond. Dub.*
6. Subsulphated.
Sulphas ferri exsiccatus. *Ed. Dub.*
7. Muriated.
a. Tinctura muriatis ferri. *Ed. Lond. Dub.*
b. Tinctura muriatis ferri cum oxydo rubro. *Dub.*
8. With muriate of ammonia
Murias ammoniæ et ferri. *Ed. Dub.*
Ferrum ammoniatum. *Lond.*
Tinctura ferri ammoniati. *Lond.*
9. With nitrate of potass.
Liquor ferri alkalini. *Lond.*
10. Acetated.
Acetas ferri. *Dub.*
Tinctura acetatis ferri. *Dub.*
Tinctura acetatis ferri cum alcohol. *Dub.*
11. With tartrate of potass.
Ferrum tartarizatum. *Lond.*
Tartarum ferri. *Dub.*
Vinum ferri. *Dub.*

Off.—Ferri ramenta et fila. *Lond.*
Ferri limatura. *Ed.*
Ferri scobs. *Dub.*

Iron. Iron-filings. Iron-wire.

Medical use.—The general virtues of this metal, and the several preparations of it, are, to constringe the fibres, to quicken the circulation, to promote the different secretions in the remoter parts, and at the same time to repress inordinate discharges into the intestinal tube. By the use of chalybeates, the pulse is very sensibly raised; the colour of the face, though before pale, changes to a florid red; the alvine, urinary, and cuticular excretions, are increased. Fetid eructations, and black coloured fæces, are marks of their taking due effect.

When given improperly, or to excess, iron produces headach, anxiety, heats the body, and often causes hæmorrhagies, or even vomiting, pains in the stomach, and spasms and pains of the bowels.

Iron is given in most cases of debility and relaxation.

1. In passive hæmorrhagies.
2. In dyspepsia, hysteria, and chlorosis.
3. In most of the cachexiæ, and it has been lately recommended as a specific in cancer.

4. In general debility produced by disease, or excessive hæmorrhage.

Where either a preternatural discharge, or suppression of natural secretions, proceeds from a languor and sluggishness of the fluids, and weakness of the solids, this metal, by increasing the motion of the former, and the strength of the latter, will suppress the flux, or remove the suppresion; but where the circulation is already too quick, the solids too tense and rigid, where there is any stricture or spasmodic contraction of the vessels, iron, and all the preparations of it, will aggravate both distempers.

Iron probably has no action on the body when taken into the stomach, unless it be oxidized. But during its oxidizement, hydrogen gas is evolved; and, accordingly, we find that fetid eructations are considered as a proof of the medicine having taken effect. It can only be exhibited internally in the state of filings, which may be given in doses of from five to twenty grains, either in the form of powder, with some aromatic, or made into an electuary or bolus or pills with any bitter extract. Iron-wire is to be preferred for pharmaceutical preparations, both because it is the most convenient form, and because it is always made of the purest iron.

FERRI OXIDUM NIGRUM. *Ed. Dub.*

Off.—Ferri squamæ. *Ed. Dub.*

The scales of iron. The scales of the oxide.

WHEN iron is heated to redness in the smith's forge, to render it more malleable, its surface becomes oxidized by the action of the atmospheric air; and as the oxide formed does not adhere to the iron, it is easily separated by percussion on the anvil, and flies off in the state of sparks, which, when cooling, constitute the scales of iron. In these the iron is oxidized to that degree in which it is soluble in acids, without the production of hydrogen gas; therefore, when taken into the stomach, they do not produce the distention and flatulence occasioned by the use of the filings.

SULPHAS FERRI. *Dub.*

Sulphate of iron. Green vitriol. Copperas.

THE sulphate of iron of commerce is commonly obtained by the spontaneous oxidizement of sulphuretted iron, and subsequent lixiviation and crystallization. It is never pure, and often contains zinc or copper. The copper may be separated by adding some metallic iron to the solution; but we have no means of separating the zinc; therefore, in order to obtain it in a state of purity, we must prepare it by dissolving iron in diluted sulphuric acid. Its crystals are transparent rhomboidal prisms, of a fine green colour. They are soluble in two parts of cold, and in less than their own weight of boiling water. They are insoluble in alcohol.

They are composed of

Black oxide of iron,	28	36	Green hydro-oxide of iron.
Water of composition,	8		
		26	Sulphuric acid.
		38	Water of crystallization.
		100	

Green sulphate of iron is decomposed by all the earths and alkalies, and by those salts whose base forms an insoluble compound with sulphuric acid. It is also decomposed by exposure to the air, especially when in solution, and by all substances which part readily with their oxygen. The oxide of iron absorbs oxygen, and passes to the state of red oxide, which forms a red sulphate, possessing properties very different from those of the green sulphate.

Taken internally, the green sulphate is apt to excite pain in the stomach, and spasms in the bowels; and in large doses it causes vomiting. In small doses, however, of from one to three grains, it is sometimes given as a tonic, astringent, or anthelmintic.

FERULA ASSA FŒTIDA. *Ed. Lond. Dub.*

Willd. g. 539. *sp.* 11. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Assa fœtida.

Off.—Gummi resina ferulæ assæ fœtidæ. *Ed.*
Assa fœtidæ gummi resina. *Lond.*
Assa fœtida. *Dub.*
The gum-resin.

The plant which furnishes assa fœtida is perennial, and a native of the south of Persia. The seeds of a congenerous species growing in the north of Persia, the *Ferula Persica,* was sent from Dr. Guthrie of St. Petersburgh to Dr. Hope, which vegetated and produced fertile seeds at Edinburgh. The gum-resin is procured from the roots of plants which are at least four years old. When the leaves begin to decay, the stalk is twisted off, and the earth removed from about their large tapering roots. The top of the root is some time afterwards cut off traversely; and in forty-eight hours, the juice which has exuded is scraped off, and a second transverse section is made. This operation is repeated until the root be entirely exhausted of juice. After being scraped off, the juice is exposed to the sun to harden.

It is brought to us in large irregular masses, composed of various little shining lumps or grains, which are partly of a whitish colour, partly reddish, and partly of a violet hue. Those masses are accounted the best which are clear, of a pale reddish colour, and variegated with a great number of elegant white tears.

This drug has a strong fetid smell, somewhat like that of garlic; and a bitter, acrid, biting taste. It loses some of its smell and strength by keeping, a circumstance to be particularly regarded in its exhibition.

Neumann got from 1920 parts, 1350 alcoholic extract, and afterwards 190 watery; and inversely, 550 watery. The smell resides entirely in an essential oil, which rises in distillation both with alcohol and water. Neumann got more than 60 from 1920 grains.

Medical use.—It is the most powerful of all the fetid gums, and is a most valuable remedy. It acts as a stimulant, antispasmodic, expectorant, emmenagogue, and anthelmintic. Its action is quick and penetrating.

It is often serviceable,

1. In croup.
2. In dyspepsia, amenorrhœa, and chlorosis.
3. In asthma, dyspnœa, and hysteria.
4. In tympanites and worms.

It is exhibited,

1. In substance, in the form of pills; in doses of from five to twenty grains, either alone, or combined with bitter extracts or purgatives.
2. Dissolved in some simple distilled water.
3. Dissolved in alcohol.
4. In the form of clyster, to the extent of about two drachms.

FICUS CARICA. *Ed. Lond. Dub.*

Murray, g. 1168. *sp.* 1. *Polygamia Triœcia.*—Nat. ord. *Scabridæ.*

The fig-tree.

Off.—Ficus caricæ fructus. *Ed.*
Caricæ fructus (conditus). *Lond. Dub.*
The preserved fruit.

This tree is probably a native of Asia, but grows plentifully in the south of Europe. The fresh fruit is very pulpy, but when dried is easily preserved. To this country figs are chiefly brought from the Levant. They consist almost entirely of sugar and mucilage, and are therefore demulcent. They also form a very convenient suppurating cataplasm, either roasted or boiled, and applied as hot as can be borne to parts where other cataplasms cannot easily be kept applied.

FRAXINUS ORNUS. *Ed. Lond. Dub.*
Murray, g. 1160. *sp.* 2. *Polygamia Diœcia.*—Nat ord. *Ascyrbideæ.*
Manna-ash.

Off.—Succus concretus, *Manna* dictus. *Ed.*
Manna. *Lond. Dub.*
The concrete juice. Manna.

MANNA is obtained from other species of fraxinus besides the ornus, and especially from the rotundifolia. It is principally collected in Calabria, Apulia, and Sicily. In the warmest season of the year, from the middle of June to the end of July, a clear juice exudes from the stem and branches of these trees, which, when naturally concreted on the plants and scraped off, is called Manna in the tear; but if allowed to exude on straws, or chips of wood fastened to the tree, it is called Canulated or flaky manna. The common, or fat manna, is got by incisions made after the spontaneous exudation is over, and is in larger masses, and of a redder colour. The best Calabrian manna is in oblong, light, friable pieces or flakes, of a whitish or pale yellow colour, and somewhat transparent. The inferior kinds are moist, unctuous, and dark-coloured. Manna appears often to be formed and deposited by insects. Manna is said to be sometimes counterfeited by a composition of sugar and honey, mixed with a little scammony: there is also a factitious manna, which is white and dry, said to be composed of sugar, manna, and some purgative ingredient, boiled to a proper consistence. This may be distinguished by its weight, solidity, and transparent whiteness, and by its taste, which is different from that of manna.

According to Neumann, manna dissolves in alcohol. On setting the solution in a digesting heat, it gradually deposits 5-8ths of the manna, of a fine white colour, light, spongy, and in some degree crystalline, melting instantly upon the tongue, and impressing an agreeable sweet taste, without any of the nauseousness of the manna. By further evaporation 1-4th more is obtained, similar to manna; and on continuing the evaporation, a thick extract is formed, of the consistence of a balsam, which can scarcely be fully exsiccated, but continues moist, and resembles civet grown brown by age. This extract, which is about 1-8th, contains all the nauseous matter of the manna. The experiments which I have made verify these observations. The quantity of matter which a hot alcoholic solution of manna deposits on cooling is various: a saturated solution concretes into a perfectly dry, white, spongy, crystallized mass. When much less concentrated, it deposits a congeries of most beautiful snow white acicular crystals. A saturated solution in boiling water also forms a solid crystallized mass on cooling. Fourcroy says, that when a solution of manna is clarified with whites of eggs, and sufficiently concentrated, crystals of sugar may be obtained from it. But with Dr. Thomson the experiment did not succeed: its crystals were always acicular, and more difficultly formed.

Medical use.—Manna is a mild agreeable laxative, and may be given with safety to children and pregnant women: nevertheless, in some particular constitutions, it acts very unpleasantly, producing flatulency, and distension of the viscera: these inconveniencies may be prevented by the addition of any grateful warm aromatic. Manna operates so weakly as not to produce the full effect of a cathartic, unless taken in large doses; and hence it is rarely given with this intention by itself. It may be commodiously dissolved in the purging mineral waters, or joined with the cathartic salts, senna, rhubarb, or the like.

FUCUS VESICULOSUS. *Lond. Dub.*

Murray, g. 1205. *sp.* 8.—Nat ord. *Algæ.*
Off.—Fucus. *Lond.*
Quercus marina, fructibus præsentibus. *D.*
Yellow bladder wrack.

This is one of the most common sea-weeds found on our shores. Its value in the manufacture of kelp is well known. In medicine it is little used; but the charcoal obtained by burning it in close vessels has in some places got the name of Æthiops vegetabilis. It is to be considered as a compound of charcoal and carbonate of soda.

GENTIANA LUTEA. *Ed. Lond. Dub.*

Willd. g. 512. *sp.* 1. *Pentandria Digynia*—Nat. ord. *Rotaceæ.*
Gentiana. Lond. Dub.
Gentian.

Off.—Radix Gentianæ luteæ. *Ed.*
Radix Gentianæ. *Lond. Dub.*
The root.

Gentian is a perennial plant which grows upon the Alps, Pyrennees, Appenines, and other mountainous situations in the temperate parts of Europe

The roots are long, thick, externally of a brown colour, and wrinkled: internally spongy, and of a yellow colour, without any remarkable smell, but surpassing in bitterness all other European vegetables. Alcohol dissolves only the bitter extractive water both the extractive and mucilage.

Neumann got from 960 grains 390 alcoholic, and afterwards 210 insipid watery extract; and inversely, 540 watery, and only 20 alcoholic.

Medical use.--Gentian possesses the general virtues of bitters in an eminent degree, and it is totally devoid of astringency On dead animal matter it acts as an antiseptic. Taken into the stomach, it proves a powerful tonic, and in large doses it evacuates the intestines. It is useful in debility of the stomach, in general debility, and in gout. Combined with astringents, it cures intermittents. Externally, it is applied to putrid ulcers.

GEOFFRÆA INERMIS. *Ed.* *Geoffroya inermis. Dub.*

Diadelphia Decandria.—Nat. ord. *Papilionaceæ.*

Cabbage-tree.

Off.—Cortex Geoffrææ inermis. *Ed.*
Cortex Geoffoææ. *Dub.*
The bark.

The bark of this tree, which grows in the low savannahs of Jamaica, is of a grey colour externally, but black and furrowed on the inside. The powder looks like jalap, but is not so heavy. It has a mucilaginous and sweetish taste, and a disagreeable smell.

Medical use.—Its medical effects are much greater than its sensible qualities would lead us to expect. When properly exhibited, it operates as a powerful anthelmintic, especially in cases of lumbrici. It is given in form of powder, decoction, syrup, and extract, but should always be given in small doses. The decoction is preferred; and is made by slowly boiling an ounce of the fresh dried bark in a quart of water, till it assume the colour of Madeira wine. This sweetened is the syrup; evaporated it forms an extract. It commonly produces some sickness and purging; sometimes violent effects, as vomiting, delirium and fever. These last are said to be owing to an overdose, or to drinking cold water; and are relieved by the use of warm water, castor oil, or a vegetable acid.

GEUM URBANUM. *Dub.*

Willd. g. 1002. *sp.* 3. *Smith, g.* 237. *sp.* 1. *Icosandia Polygynia.* —Nat. ord. *Senticosæ.*

Common avens. Herb Bennet.

Off.—Radix. The root

Avens is a common perennial plant which grows wild in shady uncultivated places, and flowers from May to August. The root is fibrous, externally of a dark red colour, internally white, and has the flavour of cloves, with a bitterish astringent taste. Its virtues are said to be increased by cultivation, and the large roots are preferred to the smaller fibres. It must be dug up in spring, when the leaves begin to appear, for the smell is then strongest; indeed, it is hardly to be perceived when it flowers. It must be dried in the air, but not with a strong heat, as its flavour would be dissipated, and its virtues diminished. It tinges both water and alcohol red. Half an ounce yielded 80 grains of resinous, and 20 of gummy extract; the former had the smell of the root, the latter was without smell, and merely astringent. Water distilled from it has a pleasant flavour, and carries over a little thickish essential oil.

Medical use.—Avens is an old febrifuge, mentioned by Ray, but again brought into notice by Buckhave. It is recommended as a substitute for cinchona, in intermittent fevers, dysentery, and chronic diarrhœas, flatulent colic, affections of the primæ viæ, asthmatic symptoms, and causes of debility. Half a drachm or a drachm of the powder may be given four times a-day, simply, or made up into an electuary with honey or rhubarb. Two table spoonfuls of the decoction may be given every hour; or a table spoonful of a tincture, made with an ounce of the root to a pound of alcohol, three or four times a-day. As an indigenous remedy it deserves notice.

GLYCYRRHIZA GLABRA. *Ed. Lond. Dub.*

Murray, g. 882. *sp.* 2. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Liquorice.

Off.—Radix Glyc. glab. *Ed.* Radix Glycyrr. *Lond. Dub.*
Extractum Glyc. glabr. *Ed.*
The root and the extract.

LIQUORICE is a perennial plant, and a native of the south of Europe, but the roots, which are raised for medical purposes in considerable quantities in England, are preferred to those imported from abroad, which are very frequently mouldy and spoiled. The roots are very long, about an inch thick, flexible, fibrous, externally of a brown colour, internally yellow, and, when fresh, juicy. Their taste is very sweet, combined with a slight degree of bitter, when long kept in the mouth. They are prepared for use by peeling them, cutting away all the fibres and decayed parts. It is necessary to preserve them in a very dry place, as they are extremely apt to spoil.

The powder of liquorice usually sold is often mingled with flour, and perhaps also with substances not so wholesome. The best sort is of a brownish yellow colour, the fine pale yellow being generally sophisticated, and it is of a very rich sweet taste, much more agreeable than that of the fresh root.

Neumann got from 960 parts of dried liquorice, 300 alcoholic extract, and afterwards 210 watery; and inversely, 540 watery, and only 30 alcoholic. The original alcoholic extract is the sweetest.

Medical use.—Its predominant constituents being saccharine and mucilaginous matter, its only action is that of a mild demulcent, and as such it is frequently used in catarrh, and in some stomach complaints, which seem to arise from a deficiency of the natural mucus, which should defend the stomach against the acrimony of the food, and the fluids secreted into it.

On account of its bulk it is rarely exhibited in substance, but more frequently in infusion or decoction.

EXTRACTUM GLYCYRRHIZÆ GLABRÆ. *Ed.*

Extract of liquorice.

As this extract is never prepared by the apothecary, but commonly imported from other countries, the Edinburgh college have inserted it in their list of materia medica. It is imported in cylindrical rolls, covered with bay leaves. It should be perfectly black, brittle when cold, and break with a smooth and glassy fracture, have a sweet taste, without empyreuma, and be entirely soluble in water. It is prepared from the fresh roots by expression, decoction, and inspissation.

The best foreign extract of liquorice is prepared in Catalonia, but it is not so pure or so agreeable as the refined liquorice sold in the shops, in small cylindrical pieces, not thicker than a goose-quill.

Neumann got from 480 parts of Spanish extract, 460 watery extract, and the residuum was not affected by alcohol; and inversely, he got 280 alcoholic, and 180 watery extract. In this last case the alcoholic extract contained all the sweetness, the watery having scarcely any taste. From the similarity of their taste, and its not being crystallizable, Dr. Thomson has referred its saccharine matter to his new genus sarcocoll.

The extract possesses the same properties with the root, and is used for the formation of several kinds of troches.

GRATIOLA OFFICINALIS. *Ed. Dub.*

Willd. g. 49. *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Personatæ.*

Hedge-hyssop.

Off.—Herba Gratiolæ officinalis. *Ed.*
Herba Gratiolæ. *Dub.*
The plant.

THIS is a perennial plant, a native of marshy situations in the south of Europe. It is gathered for use when in flower. It has no smell, but a very bitter, somewhat nauseous taste. It is a drastic purgative and emetic, and a very powerful anthelmintic, but its use requires caution. In substance it may be given to the extent of half a drachm, and in infusion to three drachms.

GUAIACUM OFFICINALE. *Ed. Lond. Dub.*

Willd. g. 819. *sp.* 2. *Decandria Monogynia.*—Nat. ord. *Gruinales.*

Guaiacum. Lond. Dub.

Guaiac.

Off.—Lignum Guaiaci officin. *Ed.* Lignum Guaiaci. *L. D.*
Resina Guaiaci officin. *Ed.* Resina Guaiaci. *Lond.*
Gummi-resina Guaiaci. *Dub.*
The wood and resin.

This tree is a native of the West Indies, and grows to a middling size. The wood is heavier than water, very hard, resinous, and of a greenish black colour. Its taste is bitterish, and when kindled it gives out a pleasant smell. It is brought either in pieces, which are sometimes covered with a pale yellow alburnum, or already rasped, when by division its colour appears greenish brown, or yellow. The bark is thin, of an ash-grey, or blackish colour, and apparently composed of several laminæ. It is less resinous than the wood. Neumann got from 7680 parts of the wood, 1680 alcoholic, and 280 watery extract; and inversely, 740 watery, and 960 alcoholic. From 3840 of the bark he got 560 alcoholic, and 320 watery; and inversely, 620 watery, and 240 alcoholic. The resin exudes spontaneously in tears, but is principally obtained by sawing the wood into billets about three feet long, which are then bored with an augre longitudinally. One end of these is laid upon a fire, so that a calabash may receive the melted resin, which runs through the hole as the wood burns. It may be also obtained by boiling the chips or sawings of the wood in water and muriate of soda. The resin swims at the top, and may be skimmed off.

Guaiac has a brownish yellow colour externally; when held against the light is transparent, breaks with an uniform smooth shining fracture, of a bluish-green colour, is pulverizable, and the powder has a white colour, gradually becoming bluish-green, is fusible in a moderate heat, but not softened by the heat of the fingers, without proper smell or taste, but when thrown on hot coals diffusing an agreeable odour, and when swallowed in a state of minute division, causing an insufferable burning and prickling in the throat. Its specific gravity is 1.23. Neumann got from 480 parts, 400 alcoholic, and only 10 watery extract; and inversely, 80 watery, and 280 alcoholic. Mr. Brande has more lately investigated this substance with much care. Digested with water, about one tenth of it is dissolved, the water acquiring a sweetish taste and greenish-brown colour. The liquid, when evaporated, leaves a brown substance, soluble in hot water and alcohol, but scarcely in sulphuric ether, and precipitating the muriates of alumina and tin. Alcohol readily forms with guaiac a deep brown-coloured solution, rendered milky by water, and precipitated pale green by the muriatic and sulphuric acids, brown by the nitric, and pale blue by the oxymuriatic, but not by the acetic acid or alkalies. The solution in ether exhibits nearly the same properties. Guaiac is soluble in about 15 parts of solution of potass, and in 38 of ammonia; and the solutions are precipitated by the nitric, muriatic, and diluted sulphuric acids. Sulphuric acid dissolves it, and nitric acid converts it into oxalic acid. On being burnt, it leaves a large proportion of charcoal. Dr. Wollaston has discovered a curious property of guaiac. By exposure to air and light, it acquires a green colour. This effect is produced in the greatest degree by the most refrangible rays. In the least refrangible rays it is disoxydized, and the yellow colour is restored. The same effect is produced by hot metal. According to this analysis, it differs from the resins in the changes of colour produced on it by air and light, and the action of the acids, in not forming tannin when treated with nitric acid, and in the large proportion of charcoal it affords when burnt. It is sometimes adulterated with colophony or common resin; but the fraud is easily detected by the smell of turpentine emitted when thrown on live coals.

Medical use.—Taken internally, guaiac commonly excites a sense of warmth in the stomach, a dryness of the mouth, with thirst. It increases the heat of the body, and quickens the circulation. If the patient be kept warm, it produces diaphoresis; if exposed freely to the air, an increased flow of urine. In large doses it is purgative.

Guaiac is a useful remedy,

1. In rheumatism and gout.
2. In certain venereal symptoms; as in foul indolent ulcers, and a thickened state of the ligaments or periosteum, remaining after the body is reduced by a mercurial course. Guaiac will also suspend the progress of some of the secondary symptoms; but it is totally incapable of eradicating the disease.
3. In cutaneous diseases.
4. In ozæna, and scrofulous affections of the membranes and ligaments.

The wood is always exhibited in decoction. From the resinous nature of the active constituent of this substance, this cannot be a very active preparation, as the menstruum is totally incapable of dissolving, though it may suspend a little of the resin. The decoction of an ounce may be drunk in cupfuls in the course of a day.

The resin may be exhibited,

1. In substance, either made into pills, or suspended in water in the form of an emulsion. In this way, from 10 to 30 grains of the resin may be taken in the day.
2. In solution; in alcohol. About half an ounce of the tincture, with three ounces of water, is a sudorific dose for an adult, if he attend to keeping himself warm.
3. Combined with an alkali.

HÆMATOXYLON CAMPECHIANUM. *Ed. Dub. Lond.*

Willd. g. 830. *sp.* 10. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ.*

Logwood.

Off.—Lignum Hæmat. Camp. vulgo Lignum Campechense. *Ed.*
Lignum Hæmatoxyli. *Lond. Dub.*
The wood.

This tree was introduced from the Honduras into Jamaica, where it is now very common. The wood is firm, heavy, and of a dark red colour. Its taste is sweet, with a slight degree of astringency. It forms a precipitate with a solution of gelatine, very readily soluble in excess of gelatine, and with sulphate of iron it strikes a brighter blue than any other astringent I have tried. It is used principally as a dye-wood, but also with considerable advantage in medicine.

Its extract is sweet and slightly astringent; and is therefore useful in obstinate diarrhœas, and in chronic dysentery.

HELLEBORUS.

Willd. g. 1089. *Smith, g.* 256. *Polyandria Polygynia.*—Nat. ord. *Multisiliquæ.*

Sp. 2. *Willd.* Helleborus Niger. *Ed. Lond. Dub.*

Black hellebore.

Off.—Radix. The root.

This plant, which was formerly called *Melampodium*, is perennial, and grows wild in the mountainous parts of Austria, and on the Pyrenees and Appenines. The earliness of its flowers, which sometimes appear in December, has gained it a place in our gardens.

The roots consist of a black furrowed roundish head, about the size of a nutmeg, from which short articulated branches arise, sending out numerous corrugated fibres, about the thickness of a straw, from a span to a foot in length, deep brown on the outside, white or yellowish white within, and of an acrid, nauseous, and bitterish taste, exciting a sense of heat and numbness in the tongue, and of a nauseous acrid smell. These fibres only are used in medicine, and the head and decayed parts are rejected. For the roots of the real black hellebore, the roots of the Adonis vernalis, Trollius Europæus, Actæa spicata, Astrantia major, Helleborus viridis fœtidus, Veratrum album, and Aconitum neomontanum, are often substituted. The last is a most virulent poison, and may be distinguished by its roots being fusiform, or nearly globular, sending out numerous very brittle fibres, of a greyish black or brown colour, as thick as a man's finger, and repeatedly divided. But the surest way to avoid mistakes, is by the apothecary cultivating the plant itself in his own garden.

Neumann got from 2880 grains 380 alcoholic, and 181 watery extract; and inversely, 362 watery, and 181 alcoholic. Its active constituent seems to be of a volatile nature; for it loses its virtues by keeping, and water distilled from it has an acrid taste.

Medical use.—In large doses, hellebore is a drastic purgative; in smaller doses, it is diuretic and emmenagogue. It is principally used as a purgative in cases of mania, melancholy, coma, dropsy, worms, and psora, and as an emmenagogue. But its use requires very great caution, for its effects are very uncertain, and affected by many circumstances.

It is commonly exhibited in the form of extract, although its activity be much dissipated by the preparation. An infusion or tincture certainly promise to be medicines of more uniform powers Willdenow says, that the black hellebore of the ancients is his fifth species, the Helleborus orientalis.

Sp. 6. *Willd.*; *sp.* 2. *Smith.* HELLEBORUS FOETIDUS. *L. D.* Bears-foot. Stinking hellebore. Settiswort.

Off.—Folia Hellebori fœtidi. *Lond.*
Folia Helleborastri. *Dub.*
The leaves.

THIS species is a native of England. It is perennial, grows in shady places, and under hedges, and flowers in March and April. The leaves have an acrid, bitter, nauseous taste, and unpleasant smell, especially when they are fresh. When dried, they are frequently given as a domestic medicine to destroy worms; but they must be used sparingly, being so violent in their operation, that instances of their fatal effects are recorded.

HIRUDO MEDICINALIS. *Dub.*

The leech.
Cl. Vermes. Ord. *Helmintheca,*

Only one species of leech is used in medicine. It has a flat and slimy body, composed of rings, tapering towards the head, which is turbinated, commonly about two or three inches long, and of the thickness of a goose-quill, but capable of elongating or contracting itself very much. Its back is of a dull olive-green colour, divided into three nearly equal parts by four yellow longitudinal lines, the two lateral entire, the two central broken with black. Besides these, between the lateral and central lines on each side, there are two others, resembling a chain of black and yellow. The belly is turkey blue, irregularly marked with yellow spots. It attaches itself to solid substances by either end, being furnished with a circular sucker at the anal extremity, and a horse-shoe one at the head, with a triangular mouth in the centre.

They should be collected in summer, in waters having a clear sandy bottom, as the bite of those found in stagnant waters and marshes is said to cause pain and inflammation. For the same reason, the horse-leech, which is entirely brown, or only marked with a marginal yellow line, is commonly rejected, although they are used frequently in the north of Europe, and during the late scarcity of leeches have occasionally been employed, without any bad consequences, in this country. The vulgar story of their drawing the whole blood out of the body, by evacuating it at one end as fast as they sucked it in at the other, if true, would give them a superiority over the others, as when a sufficient quantity of blood was drawn, there could be no difficulty in making them quit, even without passing a ligature round their necks.

Leeches are best preserved for use in a bottle half filled with pure spring or river water, and covered with gauze or muslin, although they are said not to die even in an exhausted receiver, or in a vessel filled with oil. It is advisable frequently to change the water in which they are kept. although there are instances of their living many months, and even years, in the same water; and it is remarkable that water, in which they are, keeps much longer sweet than by itself. It is scarcely necessary to observe, that whenever the water becomes turbid, or foul, or gets an unpleasant smell, or any of the leeches dies in it, it should be changed. They should always be kept in a moderate temperature, about 50° Fahr. Some recommend throwing a little bran into the water; but it is so well ascertained that they will live for years without any such addition, that it is better not to attempt to feed them, until we are better acquainted with their natural food. Though apparently so hardy, leeches are sometimes subject to great mortality, from unknown causes, as in 1798 and 1799. Infection, in some cases, seems evident. To avoid danger from this source, they should be kept rather in several small vessels, than in one large reservoir; and when fresh leeches are procured, they should always be kept by themselves, and their health ascertained, before they are added to the general stock. When they have gorged themselves with blood, they frequently die of indigestion, and cause a great mortality even among those who have not been used. To avoid this danger, leeches, which have recently sucked, should also be kept by themselves, until they have recovered their usual vigour. The treatment of the individuals which have performed their office has been the subject of some controversy. One recommends using no means to make them disgorge the blood they have sucked, but only to immerse them for half an hour in milk-warm water, and to change their water regularly every second day for some time; others advise stripping them, as it is called, that is, taking hold of the tail between the finger and thumb of the left hand, and drawing the animal through those of the right, so as to evacuate the blood; while others, again, apply salt to their heads, until they vomit all the blood they have sucked. Leeches change their skin frequently. At that time they are subject to indisposition, and will not bite. The removal of the old cuticle may sometimes be assisted by wiping them with a bit of soft linen.

Medical use.—Leeches are a very old and useful remedy in every case requiring local blood-letting. They cause less irritation than cupping, and can often be applied nearer to the part.

They are used,

1. In inflammation of all kinds, ophthalmia, phrenitis, cynanche, rheumatismus, odontaglia, podagra.
2. In some cases of rubeola and scarlatina.
3. In suppressed natural or habitual hæmorrhagies, especially piles.
4. In plethora of the head, chincough, in mania from suppressed discharges.
5. Dysuria phlogistica.

The application of leeches is sometimes attended with difficulty. When changing their skin, they will not bite, and are averse to it in cloudy rainy weather, and in the evening. When kept out of the water some minutes before they are applied, and allowed to crawl on dry linen, they are said to bite more eagerly. The part to which they to be are applied should be very well washed, first with soap and water, and afterwards with water, or milk and water, and if covered with strong hairs, should be shaved. When they are not inclined to bite, the part may be moistened with milk, or a little blood drawn from it by a scratch with a lancet. When they fix, they inflict, without causing much pain, a wound of three minute flaps, meeting at equal angles, from which they suck blood until they are gorged, and drop off spontaneously, or are forced to quit their hold by sprinkling on them a little salt. A large leech will draw about an ounce of blood; but the quantity may be much increased by bathing the wounds with tepid water, or applying over them cupping glasses. Sometimes it is more difficult to stop the bleeding; but it will always cease on applying a little lint, and continuing pressure a sufficient length of time.

HORDEUM DISTICHON. *Ed. Dub. Lond.*

Willd. g. 151. *sp.* 3 . *Triandria Digynia.*—Nat. ord. *Gramina.*
Barley.

Off.—Semina Hordei distichi. *Ed. Dub.*
Semina Hordei. *Lond.*
The seed. Pearl-barley.

Barley is an annual plant, cultivated in almost every country of Europe. Linnæus says, that it is a native of Tartary, but without adducing sufficient proof.

Pearl-bārley is prepared by grinding off the husk of rough barley, and forming the grain into little round granules, of a pearly whiteness. In this state, barley consists almost solely of amylaceous matter; when boiled it forms an excellent article of nourishment; and a decoction of it, properly acidulated, is one of the best beverages in acute diseases.

HUMULUS LUPULUS. *Lond.*

Willd. species Plant. Vol. iv. p. 769.
Smith's Flor. Brit. 1077.

Off.—Humuli strobili. *Lond.*
The strobiles dried.

The hop is an indigenous perennial climbing plant, cultivated to a great extent in Kent, and some other counties in England, for its leafy tops, which are used in the brewing of ale and porter; and as a very considerable revenue arises from the duty imposed on them, the use of all other bitters, such as quassia, &c. is prohibited by act of parliament; as, indeed, hops themselves once were. In the north of Europe, the young shoots are eaten instead of asparagus.

Hops are intensely bitter, aromatic, and astringent. By simple infusion the aroma is extracted; by short boiling the bitter, and by long-continued boiling, the aroma is dissipated, and the astringency predominates. The aroma resides in a volatile oil, and the astringency in a species of tannin, as sulphat of iron is blackened by it. The old writers say, that hops are added to malt liquors on account of the lithontriptic virtues which they were supposed to possess. Ray says, that since the Londoners added hops to their beer, they have been less subject to calulous complaints; and if we were to believe Lobb, a very hard urinary calculus was softened by a decoction of hops. Their evident effects are to impart an aromatic bitter, and to retard the acetous fermentation; for malt liquors keep longer in proportion to the quantity of hops added, and the bitterness decreases as the liquor becomes ripe, and disappears when it verges to acidity. Bergius supposes that the sweetness of the malt would hurt the stomach, were it not corrected by the bitterness of the hop. It also probably communicates a narcotic quality. A pillow stuffed with hops is said to have long been a popular remedy, and recent experiments have confirmed the fact, and led to the employment of various preparations of hops in medicine. The dose of the powder is about three grains, although it may be remarked that it is very difficult to powder. It produced sleep, in the experiments of Dr. De Roches, in rheumatic, syphilitic, and pectoral complaints. The tincture seemed to possess the same anodyne virtues, but it was not so uniform in its action. Dr. Maton gave it in the form of tincture and extract, with the best effects, in articular rheumatisms. He did not observe that it had any influence in relaxing the bowels, but the contrary; and he is disposed to believe that the pulse is reduced in frequency, and increased in firmness, by this medicine, in a very direct manner. An ointment compounded with the hop is said, by Mr. Freake, to have eased the violent pain in the last stage of cancer, when all other applications were ineffectual.

HYDRARGYRUM. *Dub.*
Hydrargyrus. Lond. Ed.
Mercury. Quicksilver.

The general chemical and physical properties of this metal have been already enumerated. We shall now treat of it more minutely, as forming an important article in the materia medica.

It is found,

I. In its metallic state:
  a. Uncombined.
  b. Alloyed with silver.
  c. Alloyed with copper.
  d. Combined with sulphur (Cinnabar).
  e. Combined with hydroguretted sulphur (Æthiops minerale).
II. Oxidized:
  a. Combined with muriatic acid.
  b. ——————— sulphuric acid.

There are considerable mines of mercury in Hungary and in Spain; and what is employed in England is principally imported from the former country.

Mercury, taken into the stomach in its metallic state, has no action on the body, except what arises from its weight or bulk. It is not poisonous, as was vulgarly supposed, but perfectly inert; but, in its various states of combination, it produces certain sensible effects. It quickens the circulation, and increases all the secretions and excretions. According to circumstances, the habit of the body of the patient, the temperature in which he is kept, the nature of the preparation, and the quantity in which it is exhibited, its effects are indeed various: it sometimes increases one secretion more particularly, sometimes another; but its most characteristic effect is the increased flow of saliva which it generally excites, if given in sufficient quantity. Its particular effects, and means of producing each of them, will be noticed hereafter.

Mercury, or some of its preparations, is exhibited,

1. As an errhine. The sub-sulphate of mercury.
2. As a sialogogue. Mercury, in almost any form.
3. As a cathartic. The sub-muriate of mercury, (calomel).
4. As a diuretic. The oxides, the muriate, and the sub-muriate, combined with other diuretics.
5. As a sudorific. Calomel, conjoined with a sudorific regimen.
6. As an emmenagogue.
7. As an astringent. Muriate of mercury.
8. As a stimulant. Muriate of mercury.
9. As an antispasmodic.
10. As an anthelmintic.

With some of these views, mercury is frequently exhibited,

1. In febrile diseases; in obstinate agues.
2. In inflammatory diseases; in indolent and chronic inflammations, especially of the glandular viscera, as the liver, spleen, &c.
3. In exanthematous diseases; variola.
4. In profluvia; in dysentery.
5. In spasmodic diseases; tetanus, trismus, hydrophobia, &c.
6. In cahectic diseases; anasarca, ascites, hydrothorax, hydrocephalus, &c.
7. In impetigines; scrofula, syphilis, lepra, icterus, &c.
8. In local diseases; in caligo corneæ, amaurosis, gonorrhæa, obstipatio, amenorrhœa suppressionis, tumours of various kinds, herpes, tinea, psora, &c.

Mercury occasionally attacks the bowels, and causes violent purging, even of blood. The effect is remedied by intermitting the use of the medicine, and by exhibiting opium.

At other times it is suddenly determined to the mouth, and produces inflammation, ulceration, and an excessive flow of saliva. In this case, too, the use of the mercury must be discontinued for a time; when, according to Mr. Pearson's advice, the patient should be freely exposed to a dry cold air, with the occasional use of cathartics, Peruvian bark, and mineral acids, and the assiduous application of astringent gargles. On the other hand, the sudden suppression of ptyalism is not without danger. It is most frequently caused by cold liquids being taken into the stomach, or exposure to cold and moisture, while under the influence of mercury. The danger is to be obviated by the quick introduction of mercury, so as to affect the gums, with the occasional use of the warm bath.

Sometimes also a morbid condition of the system occurs during a mercurial course, and tends to a fatal issue. Mr. Pearson has termed it Erethismus. It is characterised by great depression of strength; a sense of anxiety about the præcordia; frequent sighing; trembling, partial or universal; a small quick pulse; sometimes vomiting; a pale contracted countenance, a sense of coldness, while the tongue is seldom furred, or the vital or natural functions much disordered. In this state, a sudden or violent exertion of muscular power will sometimes prove fatal. To prevent dangerous consequences, the mercury must be discontinued, whatever may be the stage, extent, or violence of the disease for which it has been exhibited, and the patient must expose himself freely to a dry and cool air, in such a manner as shall be attended with the least fatigue; and in the course of ten or fourteen days, he will sometimes be so far recovered, that he may easily resume the use of mercury.

From many motives, both laudable and culpable, mercury has been tortured into a greater variety of forms than any other article of the materia medica. Of these Swediaur has given a complete table, in the last edition of his works on the venereal disease. It is too long for insertion in this place: I shall therefore give a systematic view of those mercurial preparations only which enter at least one of the British Pharmacopœias.

Mercury is exhibited,

I. Purified by distillation.

Hydrargyrum purificatum. *D. L.*

II. Oxidized.

A. Protoxide.

1. By precipitation, from its solution in nitrous acid, by ammonia.

Oxidum hydrargyri cinereum. *E. L.*

Pulvis hydrargyri cinereus. *D.*

2 By trituration.

a. With unctuous substances.
  Unguentum hydrargyri. *E. D.*
  ———————— fortius. *L.*
  ———————— mitius. *L. D.*
  Linimentum hydrargyri.
  Emplastrum ammoniaci cum hydrargyro. *L. D.*
  ——————— hydrargyri. *E. L.*
b. With saccharine substances.
  Pilulæ hydrargyri. *L. D. E.*
c. With carbonate of lime.
  Hydrargyrus cum creta. *L. D.*
d. With carbonate of magnesia.
  Hydrargyrum cum magnesia. *D.*
B. Peroxide.
  1. By the action of heat and air.
    Oxydum hydrargyri. *D.*
    Hydrargyri oxydum rubrum. *L.*
  2. By the action of nitrous acid.
    Oxidum hydrargyri rubrum per acidum nitricum. *E.*
    Oxydum hydrargyri nitricum. *D.*
    Hydrargyri nitrico-oxydum. *L.*
      Unguentum oxidi hydrargyri rubri. *E.*
      ——————— subnitratis hydrargyri. *D.*
      ——————— hydrargyri nitrico-oxydi. *L.*
III. Oxidized and combined with acids;
  A. Protoxide.
    1. With nitrous acid:
      Unguentum nitratis hydrargyri. *L. E.*
      ——————— supernitratis hydrargyri. *D.*
    2. With sulphuric acid:
      Sub-sulphas hydrargyri flavus. *E. L.*
      Oxydum hydrargyri sulphuricum. *D.*
    3. With muriatic acid:
      a. By sublimation.
        Sub-murias hydrargyri. *E. L.*
        ———————— sublimatum. *D.*
        Pilulæ hydrargyri submuriatis. *L.*
      b. By precipitation.
        Sub-murias hydrargyri præcipitatus. *E. D.*
    4. With acetous acid:
      Acetis hydrargyri. *E. L.*
      Acetas hydrargyri. *D.*
  B. Peroxide.
    1. Muriate.

Murias hydrargyri. *E.*
——————— corrosivum. *D.*
Oxymurias hydrargyri. *L.*
  Liquor oxymuriatis hydrargyri. *L.*
2. Sub-muriate with ammonia.
  Sub-murias hydrargyri ammoniatum. *D.*
  Hydrargyrus præcipitatus albus. *L.*
    Unguentum sub-muriatis hydrargyri ammoniati. *D.*
    Unguentum hydrargyri præcipitati albi.
IV. Combined with sulphur.
  1. By trituration.
    Sulphuretum hydrargyri nigrum. *E. D.*
  2. By sublimation.
    Hydrargyri sulphuretum rubrum. *L.*
    Sulphuretum hydrargyri rubrum. *D.*

HYOSCYAMUS NIGER. *Ed. Lond. Dub.*

Willd. g. 378. *sp.* 1. *Smith, g.* 99. *sp.* 1. *Pentandria Monogynia.*—Nat. Ord. *Solanaceæ.*

Common henbane.

Off.—Herba Hyosc. nigri. *Ed.* Folia Hyosc. *Lond.* Herba Hyosc. *Dub.*
Semina Hyosc. nigri. *Ed.* Semina Hyosc. *Lond.*
The herb and seeds.

Henbane is an annual plant, which grows in great abundance in most parts of Britain, by the road sides, and among rubbish, flowers in July. Its smell is strong and peculiar, and, when bruised, something like tobacco, especially when the leaves are burnt; and, on burning, they sparkle, as if they contained a nitrate; when chewed, however, they have no saline taste, but are insipid, mild, and mucilaginous. Henbane, in a moderate dose, often produces sweat, and sometimes an eruption of pustules, and generally sound sleep, succeeded by serenity of mind, and recruited vigour of the body; but, like the other narcotics, instead of these, it sometimes gives rise to vertigo, headach, and general uneasiness. With particular individuals, it occasions vomiting, colic pains, a copious flow of urine, and sometimes purging. In excessive doses, its effects are fatal; general debility, delirium, remarkable dilatation of the pupils of the eyes, convulsions, death. Upon the whole, like opium, it is a powerful anodyne; and, like cicuta, it is free from any constipating effect, having rather a tendency to move the belly.

Med. use.—From the writings of Dioscorides and others, it appears, that different species of henbane have been long used in the practice of medicine. By Celsus it was applied externally as a collyrium in ophthalmia; for allaying the pain of the toothach; and he gave it internally as an anodyne.

Its use, however, was for a long period entirely relinquished, until lately revived by Dr. Stórk of Vienna, in those cases where an anodyne is requisite, and where there are objections to the use of opium. It is employed in wandering rheumatic pains, in indurations of the mammæ, from retained milk, painful swellings, whether scirrhous or not, scrofulous and cancerous ulcers, inflamed piles, and spasms of the bowels from increased irritability; under the form of a cataplasm, of the bruised leaves, with bread and milk; of an ointment, made with the powder of the leaves, with wax and oil; of a simple powder, sprinkled on the sore; or of a decoction in milk as an injection. An infusion prepared by digesting the bruised leaves in olive oil, is also usefully applied in inflammation of the bowels, kidneys, testicles, urethra, painful retention of urine, and in blind piles.

An extract from the leaves, or from the seeds, is the form in which it is given internally; and it has been used with advantage in a variety of nervous affections, as mania, melancholia, epilepsy, hysteria, trismus, and spasms from injured nerves, in rheumatism and arthritis, in glandular swellings, in obstinate ulcerations, and in every case where it is desirable either to allay inordinate action, or to mitigate pain. Its dose may be gradually increased from half a grain. Collin pushed it to the length of 30 grains for a dose.

HYSSOPUS OFFICINALIS. *Ed. Dub.*

Willd. g. 1096. *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Hyssop.

Off.—Herba Hyssopi officinalis. *Ed.*
Folia Hyssopi. *Dub.*
The herb and leaves.

Hyssop is a perennial herb which grows wild in Germany. Its leaves have an aromatic smell, and a warm pungent taste. Their virtues depend entirely on an essential oil which rises in distillation both with water and with alcohol. Besides the general virtues of aromatics, they were formerly recommended in humoral asthmas, coughs, and other disorders of the breast and lungs, and were said to promote expectoration.

INULA HELENIUM. *Dub.*

Willd. g. 1489, *sp.* 1. *Smith, g.* 369 *sp.* 1. *Syngenesia Superflua.*—Nat. ord. *Compositæ radiatæ.*

Elecampane.

Off.—Radix Enulæ Campanæ. *Dub.*
The root.

THIS is a very large downy perennial plant, sometimes found wild in moist rich soils. It flowers in July and August. The root, especially when dry, has an agreeable aromatic smell: its taste, on first chewing, is glutinous, and, as it were, somewhat rancid; in a little time it discovers an aromatic bitterness, which by degrees becomes considerably acrid and pungent.

Neumann got from 480 grains of the dry root, 390 watery, and 5 alcoholic extract; and inversely, 150 alcoholic, and 300 watery. In distillation, alcohol elevated nothing, but the distilled water was first observed by Geoffroy to be milky, and mixed with flocculi of a cineritious concrete volatile oil, partly swimming, and partly sinking in the water. He also ascertained that it was fusible, and compares it to camphor or benzoic acid. Neumann likewise examined it, and considered it as a peculiar substance, having some resemblance to camphor. He found that it melts with a gentle heat, and when cold, appears softer and more unctuous; that it never assumes a crystalline form, but when dry proves opaque and crumbly; that laid on burning coals it totally exhales; that it is soluble in alcohol, but insoluble in water; and that by keeping it gradually loses the smell of elecampane. It has also been discovered by Rose to contain a matter having some analogy with starch, the properties of which have been described under the title of Inulin.

Medical use.—It is a gently stimulating medicine, nearly similar in its action to angelica. The extract is merely a slight bitter, as the essential oil is totally dissipated in the preparation.

JUNIPERUS.

Willd. g. 1841. *Smith, g.* 421. *Dioecia Monadelphia.*—Nat. ord. *Coniferæ.*

Sp. 10. *Willd. sp.* 1. *Sm.* JUNIPERUS COMMUNIS. *Ed. Lond, Dub.*

Common juniper.

Off.—Baccæ Juniperi. *Lond. Dub.*
Baccæ Juniperi communis. *Ed.*
Cacumina Juniperi. *Lond.*
The berries and tops.

THIS is an evergreen shrub, growing on heaths and hilly grounds in all parts of Europe. It flowers in May. The berries are chiefly brought from Holland and from Italy. The Italian berries are in general reckoned the best. Juniper berries have a strong, not disagreeable smell, and a warm pungent sweet taste, which, if they are long chewed, or much bruised, is followed by a bitterish one. Their predominant constituents are essential oil, and a sweet mucilaginous matter.

Medical use.—To the oil they are indebted for their stimulating, carminative, diaphoretic, and diuretic properties. They are most commonly used in the form of infusion, as a diuretic drink in dropsy. The essential oil may be separated by distillation. It possesses the same properties in a higher degree, and imparts them to ardent spirits. The peculiar flavour, and well-known diuretic effects of Hollands, are owing to the oil of Juniper. The decoction and extract are very inert preparations.

Every part of the plant contains the same essential oil; therefore an infusion of the tops is likewise diuretic. The wood, also, was formerly officinal. In warm countries a resin exudes from the juniper-tree. It is called sandarac, and is often mixed with mastich. It is not a pure resin, for, according to Mr. Giese, about one fifth of it is not soluble in water, or in alcohol, but in ether, resembling in these respects copal.

Sp. 6. JUNIPERUS SABINA. *Ed. Lond. Dub.*
Savine

Off.—Folia Juniperi Sabinæ. *Ed.* Folia Sabinæ. *Lond. Dub.*
The leaf.

THIS is an evergreen shrub, a native of Siberia and Tartary. but not unfrequent in our gardens. The leaves have a bitter, acrid, biting taste, and a strong disagreeable smell: distilled with water, they yield an essential oil in considerable quantity.

Medical use.—Savine is a warm stimulating medicine, capable of producing diaphoresis, and increasing all the secretions, but apt to excite hæmorrhagy, especially from the uterus. It is also recommended as an anthelmintic, and is said to be very efficient in the cure of gout.

Internally, a conserve of the fresh leaves is exhibited in doses of from half a drachm to a drachm.

Externally, the leaves are applied in the form of powder or infusion to warts, carious bones, and old ulcers; and in cases of gangrene, psora, and tinea; an excellent issue ointment is also prepared with the powder. The essential oil is a very active remedy.

Sp. 14. JUNIPERUS LYCIA. *Ed. Lond. Dub.*
Olibanum.

Off.—Gummi-resina Juniperi Lyciæ. *Ed.* Olibanum; Gummi-resina. *Lond. Dub.*
A gum resin.

OLIBANUM is principally collected in Arabia, and brought from Mecca to Cairo, from whence it is imported into Europe.

It consists of transparent brittle grains of different sizes, not larger than a chesnut, of a red or yellow colour, having little taste and a peculiar aromatic smell. Neumann got from 480 grains, 346 alcoholic, and 125 watery extract, and inversely, 200 watery, and 273 alcoholic. The distilled spirit and oil both smelt of olibanum, but no oil separated. Obibanum forms a transparent solution with alcohol, and a milky fluid when triturated with water: it is not fusible, but inflammable, and burns with an agreeable smell. It is the frankincense of the ancients; and the diffusion of its vapour around the altar still forms part of the ceremonies of the Greek and Roman catholic churches.

KINO. *Ed. Lond. Dub.*

Succus spissatus Eucalypti resiniferæ. *E.* Resinæ Buteæ frondosæ. *D.* Arboris, nondum descriptæ, Africanæ, gummi resina. *Lond.*

Kino, the insipissated juice of the brown gum tree of Botany Bay. The resin of the Butea frondosa. The gum-resin of a non-descript African tree.

Kino was first noticed by Dr. Fothergill, who received it from a druggist as a very fine kind of dragon's blood, and who described it as the produce of an African tree called the Pau de Sangue. In Moor's travels up the Gambia, there is a very imperfect account of the tree from which it exudes, and a copy of directions from the African company to their factors, to collect and purchase this gum; but it seems to have been brought to them only in very small quantities, and mixed with gum Senegal. This kind is no longer to be met with in commerce, and is not even mentioned by Mr. Jackson among the exports from Mogodore, or by Mr. Winterbottom, in his account of Sierra Leone.

I have found in commerce three kinds of kino, easily distinguished by their external appearance.

The first is in very small jet-black fragments, perfectly opaque, without smell, crackling under the teeth when chewed, not colouring the saliva, after some time imparting only a slight astringent taste, not fusible, and difficultly reduced to powder. Powder dark chocolate brown. Although this has been the longest known in commerce in this place, I have not been able to trace the place of its origin.

The second is in large fragments, on some of which the impression of the vessel into which it had been received while fluid, and in which it had hardened, was evident; colour very dark brown, fracture resinous, appearance homogeneous, with small air bells, in very thin splinters, transparent, and of a ruby red colour, crackling under the teeth when chewed, taste at first somewhat acid, but afterwards becoming considerably bitter and astringent, succeeded by a peculiar sweetness, infusible, and friable; powder of a reddish brown. This is said to be the extract of the Coccoloba uvifera or sea-side grape; and indeed by comparing it with specimens of that extract, I have no doubt of the accuracy of my information.

The third is in dark brown masses of various sizes, either smooth or rounded on the surface, or in fragments often covered with a reddish brown powder, fracture resinous and very unequal, appearance sometimes homogeneous, but more commonly heterogenous, mixed with bits of twigs, leaves, &c.; splinters transparent, ruby red, no smell, scarcely crackling under the teeth, but sometimes gritty, from the accidental mixture of sand; taste simply astringent, succeeded by sweetness, and, when long chewed, a portion adheres to the teeth; infusible and friable; powder reddish brown. This is certainly obtained from the Eucalyptus resinifera, or brown gum tree of New South Wales, by allowing the juice, which either flows from it spontaneously, or is procured by wounding the tree, to harden in the sun. Some specimens of it in its fluid state have even reached this country.

The Dublin college have indicated the butea frondosa as the source of kino, but certainly erroneously. It, however, produces in large quantities a red juice, very analogous to kino, and which may unquestionably be used as a substitute for it. The production of these substances from so many different trees in Africa, America, Asia, and New Holland, shew that kino is to be considered as a genus of which these are species.

The analysis of kino, published in the first edition of this Dispensatory, has since been confirmed by Vauquelin, as well as the conclusion drawn from them, that it consists principally of tannin, and cannot with propriety be classed among the resins or gum-resins. But the undoubted origin of the third kind, and the examination of a red astringent matter which I picked from a cavity in a specimen of the Cassuarina, or beef-wood, prove that I was hasty in supposing that kino was always obtained from astringent barks by decoction and evaporation.

Kino is much more soluble in boiling than in cold water. The decoction, therefore, on cooling, becomes turbid with a very copious red sediment. The residuum seems to be softened by the heat of boiling water, at least it agglutinates into masses resembling melted red sealing wax dropt into water. By repeated decoctions with very large quantities of water, I have never been able to exhaust it of its soluble parts: the last decoctions had still a deep red colour, and blackened solutions of iron. This residuum is not more soluble in alcohol than in water, and is not fusible, but when thrown on live coals burns away without flame. Vauquelin observed, that when the whole quantity of water necessary to dissolve the soluble parts of kino is not employed at once, the residuum becomes more insoluble. Alcohol dissolves the whole of the Botany-bay kino except its impurities. With a certain proportion of water this tincture lets fall a copious red precipitate, which may be separated by filtration, but with a larger proportion of water its transparency is only slightly disturbed. It is also remarkable, that alcohol dissolves kino entirely, but does not dissolve the residuum of the decoction. This fact would shew, that the portion extracted by the water had the property of rendering the residuum soluble in alcohol. The solutions of kino precipitate gelatine, and, according to Vauquelin, silver, lead, and antimony, white; and iron, green. I find that it resembles other astringents, in forming a black precipitate with red sulphate of iron, which, however, is converted into green by the slightest excess of the sulphate, and by a larger excess is dissolved into a bright green liquid.

Medical use.—It is a powerful remedy in obstinate chronic diarrhœas and dysenteries; in all passive hæmorrhagies, especially from the uterus; in fluor albus; and in diseases arising from laxity of the solids.

It is exhibited internally, in doses of from ten to thirty grains, in substance, or dissolved in diluted alcohol.

Externally, it is applied as a styptic, to check hæmorrhagies from wounds or ulcers, and to diminish the discharge of sanious or ichorous matter from ill-conditioned ulcers.

LACTUCA VIROSA. *Ed.*

Willd. g. 1404. *sp.* 12. *Smith, g.* 342. *sp.* 1. *Syngenesia æqualis.*—Nat. ord. *Compositæ semiflosculosæ.*

Strong-scented or cut lettuce.

Off.—Folium lactucæ virosæ. *Ed.*
The leaves.

This plant flowers in August and September, is biennial, and grows wild on rubbish and rough banks, in many places in this country.

It smells strongly of opium, and resembles it in some of its effects; and its narcotic power, like that of the poppy, resides in a milky juice.

The garden lettuce, when in flower, is also very bitter, and abounds with a milky juice, in its taste and smell remarkably like opium, for which, when dried, it has been proposed and used with success as a substitute, by Dr. Cox of Philadelphia. Before it begins to shoot, it has none of that bitterness, and contains no milky juice, and probably has not those soporific effects which are commonly ascribed to the use of lettuce.

Medical use.—An extract prepared from the expressed juice of the leaves of the plant, gathered when in flower, has been given in dropsies of long standing, proceeding from visceral obstructions, to the extent of half an ounce a-day. It is said to agree with the stomach, to quench thirst, to be gently laxative, powerfully diuretic, and somewhat diaphoretic. Plentiful dilution is allowed during its operation. Dr. Collin of Vienna asserts, that out of twenty-four dropsical patients, all but one were cured by this medicine.

LAURUS.

Willd. g. 798. *Enneandria Monogynia.*—Nat ord. *Oleraceæ.*

Sp. 1. Laurus Cinnamomum. *Ed. Lond. Dub.*
The cinnamon tree.

Off.—Cortex Lauri Cin. *Ed.* Cortex Cinnamomi. *Lond. Dub.*
Cinnamomi oleum. *Lond.* Cinn. oleum essentiale. *Dub.*
The inner bark and its essential oil.

This valuable tree is a native of Ceylon, where it was guarded with unremitting jealousy by the Dutch, that they might monopolize the commerce of its productions. They failed, however, in the attempt; and the cinnamon tree is now propagated, not only in other parts of the East Indies, but also in Jamaica, and other islands in the West Indies. Ceylon now belongs to the British, and Captain Percival has published a very interesting account of the cinnamon tree. It is found in greatest perfection in the immediate neighbourhood of Columbo, and grows from four to ten feet high, very bushy. The leaves resemble those of the laurel, and, when chewed, have the hot taste and smell of cloves. The blossom is white and very abundant, but diffuses no odour. The fruit resembles an acorn, and a species of fixed oil is obtained from it. There are several different species of cinnamon trees, or trees resembling them in Ceylon, but four only are barked by government; the honey cinnamon, the snake cinnamon, the camphor cinnamon, which is inferior to these, and yields camphor from its roots, and camphor mixed with gum from incisions made into it, and the *cabatte* cinnamon, which is harsher and more astringent than the others. The bark is collected at two seasons; the grand harvest lasts from April to August, the little harvest is in December. Such branches as are three years old are lopped off, the epidermis is then scraped off, the bark slit up, loosened, and removed entire, so as to form a tube open at one side. The smaller of these are inserted within the larger, and they are spread out to dry. They are then packed up in bundles. The tasting of those bundles to ascertain their quality is a very disagreeable duty imposed on the surgeons. It excoriates the tongue and mouth, and causes such intolerable pain as renders it impossible for them to continue the occupation two or three days successively. In their turns, however, they are obliged to resume it, and they attempt to mitigate the pain by occasionally eating a piece of bread and butter. It is then made up in large bundles about four feet long, and eighty pounds in weight. In stowing the bales on shipboard, the interstices are filled up with black pepper, a practice which is supposed to improve both spices.

The best cinnamon is rather pliable, and ought not much to exceed stout writing paper in thickness. It is of a light yellowish colour; it possesses a sweet taste, not so hot as to occasion pain, and not succeeded by any after-taste. The inferior kind is distinguished by being thicker, of a darker and brownish colour, hot, and pungent when chewed, and succeeded by a disagreeable bitter after-taste. The Dutch were accused of deteriorating their cinnamon by mixing it with a proportion of real cinnamon, but which had been deprived of its essential oil by distillation. This fraud could only be detected by the weaker smell and taste. It is also often mixed with cassia bark. This last is easily distinguishable by its fracture being smooth, and by its slimy mucilaginous taste, without any of the roughness of the true cinnamon.

By distillation with water, it furnishes a small quantity of very pungent and fragrant oil, the water itself remains long milky, and has a strong flavour of cinnamon. The watery extract in Neumann's experiment amounted to 720 from 7680 parts. With alcohol the oil does not arise in distillation, but remains in the extract, which amounts to 960.

The essential oil of cinnamon has a whitish yellow colour, a pungent burning taste, and the peculiar fine flavour of cinnamon in a very great degree. It should sink in water, and be entirely soluble in alcohol. It is principally prepared in Ceylon.

Medical use.—Cinnamon is a very elegant and useful aromatic, more grateful both to the palate and stomach than most other substances of this class. Like other aromatics, the effects of cinnamon are stimulating, heating, stomachic, carminative, and tonic; but it is rather used as an adjunct to other remedies, than as a remedy itself.

The oil is one of the most powerful stimulants we possess, and is sometimes used as a cordial in cramps of the stomach, and in syncope; or as a stimulant in paralysis of the tongue, or to deaden the nerve in toothach. But it is principally employed as an aromatic, to cover the less agreeable taste of other drugs.

Sp. 2. LAURUS CASSIA. *Ed. Dub.*
The cassia tree.

Off.—Cortex Lauri Cassiæ. *Ed.* Cortex cassiæ ligneæ. *Dub.*
Flores nondum expliciti Laur. Cass. *Ed.*
Flores nond. explic. Cass. lign. *Dub.*
The bark and flower-buds gathered before they open.

THIS tree is very similar to the former. The bark, which is imported from different parts of the East Indies and from China, has a great resemblance to the true cinnamon, from which it is only distinguishable, by being of a thicker and coarser appearance, and by its breaking short and smooth, while the cinnamon breaks fibrous and shivery.

It resembles cinnamon still more exactly in its aromatic flavour and pungency than in its external appearance, and seems only to differ from it in being considerably weaker, and in abounding more with a mucilaginous matter.

Cassia buds are the flower-buds, which are gathered and dried before they expand. They have the appearance of a nail, consisting of a round head, about the size of a pepper-corn, surrounded with the imperfect hexangular corolla, which gradually terminates in a point. They have a brown colour, and the smell and taste of cinnamon.

Medical use.—Both the bark and buds of cassia possess the same properties with cinnamon, though in an inferior degree.

The bark is very frequently, and sometimes unintentionally, substituted for the more expensive cinnamon; and the products obtained from cassia bark and buds, by distillation, are in no respect inferior to those prepared from cinnamon.

Sp. 3. LAURUS CAMPHORA. *Ed. Lond. Dub.*
Camphor tree.

Off.—Camphora. *Ed. Lond. Dub.*
Camphor.

THE camphor laurel grows in great abundance, and to a very considerable size, in the forests of Japan. It is not uncommon in greenhouses in England. Every part of the tree smells strongly of camphor, which is obtained from the trunk, branches, and root, by distillation. They are cut down into small pieces, and put into a still, with a proportion of water. After the water has been kept boiling forty-eight hours, the camphor is found adhering to the straw with which the head of the still is lined. In this state it is imported by the Dutch, and is called crude camphor. It is very impure, consisting of small brownish or dirty grey grains, mixed with straw, wood, hair, and other impurities. From these it is purified, in Holland, by a second sublimation in glass vessels; being previously mixed with quicklime, to combine with and prevent any empyreumatic oil with which it may be contaminated from subliming, while the camphor concretes in the uppet part of the vessel into cakes, convex on the one side, and concave on the other, about two or three inches thick, thinner at the edges, and generally perforated in the middle.

Pure camphor is lighter than water, very white, pellucid, somewhat unctuous to the touch, brittle, yet tough and elastic, so as to be scarcely pulverizable; shining in its fracture, and crystalline in its texture; of a bitterish, aromatic pungent taste, yet accompanied with a sense of coolness, of a strong and very penetrating smell; very volatile, inflammable, burning entirely away, without leaving any coal or ashes; capable of combining with the resins and balsams; soluble in alcohol, ether, fixed and volatile oils, and the concentrated sulphuric, nitric, muriatic, fluoric, and acetic acids; separable from these alcoholic and acid solutions by water; insoluble in water, alkalies, and the weaker acids; decomposed by heat, when mixed with alumina, into an essential oil and charcoal; and by treating it with a sufficient quantity of nitric acid, forming a portion of camphoric acid; and by treating it with sulphuric acid, forming artificial tannin.

But the production of camphor is not confined to the laurus camphora, although it furnishes almost all the camphor of commerce; it is found in very great purity in interstices among the woody fibres of an unknown tree in Borneo; it is also contained in the roots of the laurus cinnamomum and cassia, Alpinia galanga, amomum zedoaria, &c.; in the seeds of the amomum cardamomum, piper cubeba, &c.; and in many indigenous plants, as in the thymus serpyllum and vulgaris, juniperus communis, rosmarinus officinalis, salvia officinalis, mentha piperita, &c. and may be separated from the essential oils of rosemary, lavender, marjoram, and sage. An artificial camphor, differing from common camphor, in not being soluble in weak nitric acid, nor being precipitated by water from its solution in strong nitric acid, may also be prepared, by directing a stream of muriatic acid gas into oil of turpentine. Camphor is now universally considered as a peculiar principle of vegetables, and not as a resin.

Medical use.—Camphor is a very active substance, when taken into the stomach. It increases the heat of the body considerably, and gives a tendency to diaphoresis, but without quickening the pulse. At first it raises the spirits, but produces a subsequent depression, and facilitates voluntary motion. In excessive doses it causes syncope, anxiety, retchings, convulsions, and delirium.

These violent effects of camphor are most effectually counteracted by opium.

In a morbid state of the body, camphor allays inordinate actions. When the pulse is hard and contracted, it renders it fuller and softer. It removes spasms, and flitting pains arising from spasms; and in delirium, when opium fails of procuring sleep, camphor will often succeed. It is also said to correct the bad effects of opium, mezereon, cantharides, and the drastic purgatives and diuretics.

The most general indication for the use of camphor is the languor or oppression of the *vis vitæ.* It may therefore be given with advantage,

1. In all febrile diseases of the typhoid type, especially when attended with delirium.
2. In inflammations with typhoid fever, as in some cases of peripneumonia and rheumatism.
3. In eruptive diseases, to favour the eruption, or to bring it back to the skin, if, from any cause, it has suddenly receded, as in small-pox, measles, &c.
4. In many spasmodic diseases, especially mania, melancholy, epilepsy, hysteria, chorea, hiccough, &c.
5. In indolent local inflammations, not depending upon an internal cause, to excite action in that part.

As, from its great lightness, it is apt to swim upon the contents of the stomach, and to occasion pain at its upper orifice, it is necessary that it be always exhibited in a state of minute division. In order to reduce it to powder, it must be previously moistened with a little alcohol. It may then be given,

1. In powder, with sugar, magnesia, and nitrate of potass.
2. In pills, with the fetid gums and mucilage.
3. In solution, in alcohol, oil, or acetic acid.
4. Suspended in the form of an emulsion, by means of mucilage, sugar, yolk of egg, almonds, vinegar, &c.

Internally, it may be given in small doses, of from one to five grains, repeated at short intervals, as its effects are very transient, or in large doses, not under 20 grains.

Sp. 10. LAURUS NOBILIS. *Ed. Lond.*
Bay tree.

Off.—Folium Lauri nobilis. *Ed.* Folia Lauri. *Lond.*
Bacca Laur. nob. *Ed.* Baccæ Lauri. *Lond.*
Oleum fixum Laur. nob. *Ed.*
The leaves, berries, and expressed oil of the berries.

This tree is a native of the south of Europe, but bears the winters of this climate perfectly well. Both leaves and berries contain a considerable quantity of essential oil, which renders them aromatic stimulating substances.

The berries are generally brought from the Mediterranean, and are more pungent than the leaves. In Spain and Italy, a considerable quantity of oil is obtained by expression from the fresh berries. It has a green colour, and strong aromatic taste and smell. As it, therefore, is not a fixed oil, but a mixture of fixed and volatile oil, and as its peculiar properties depend entirely on the presence of the latter, it is incorrectly stated to be a fixed oil by the Edinburgh college. It should rather have been denominated, from the mode of its preparation, an expressed oil.

Medical use.—It is only used externally as a stimulant.

Sp. 34. LAURUS SASSAFRAS. *Ed. Lond. Dub.*
Sassafras.

Off.—Lignum Lauri Sass. *Ed.* Lignum Sassaf. *Lond. Dub.*
Radix Laur. Sassaf. *Ed.* Radix Sassaf. *Lond. Dub.*
Cortex Laur. Sassaf. *Ed.* Cortex Sassaf. *Dub.*
The wood, root, and bark.

This tree is a native of North America, and is cultivated in Jamaica. It is the root which is commonly employed. It is brought to us in long branched pieces. It is soft, light, and of a spongy texture; of a rusty white colour; of a strong pleasant smell, resembling that of fennel; and a sweetish, aromatic, subacrid taste. The bark is rough, of a brown ash colour on the outside, and ferruginous colour within; spongy and divisible into layers, and of a stronger taste and smell than the wood.

Neumann got from 480 grains, 80 of alcoholic, and afterwards 60 of watery extract, and inversely 120 watery, and 7.5 alcoholic. In distillation, alcohol elevates nothing, but water a ponderous essential oil, in the proportion of about 10 from 480.

Medical use.—Sassafras, from the quantity of volatile oil it contains, is a gently stimulating, heating, sudorific, and diuretic remedy.

It is best given in infusion. The decoction and extract are mere bitters, as the oil is dissipated by the preparation.

The essential oil may be obtained separate by distillation. It is of a whitish yellow colour, and sinks in water. It is highly stimulating and heating, and must be given only in very small doses.

LAVANDULA SPICA. *Ed. Lond. Dub.*

Willd. g. 1099. *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Lavender.

Off.—Spica florens Lav. spic. *Ed.*
Lavandulæ flores. *Lond. Dub.*
The flowering spikes.

LAVENDER is a well-known, small, shrubby, perennial plant, a native of the south of Europe, but frequently cultivated in our gardens, for the sake of its perfume. There are two varieties. The flowers of both have a fragrant, agreeable smell, and a warm, pungent, bitterish taste; the broad-leaved variety is the strongest in both respects, and yields in distillation thrice as much essential oil as the other; its oil is also hotter, and specifically heavier: hence, in the southern parts of France, where both kinds grow wild, this is only used for the distillation of what is called Oil of Spike. The narrow-leaved is the variety commonly met with in our gardens.

Medical use.—Lavender is a warm stimulating aromatic. It is principally used as a perfume.

LEONTODON TARAXACUM. *Ed. Lond. Dub.*

Willd. g. 1407. *sp.* 1. *Smith, g.* 344. *sp.* 1. *Syngenesia æqualis.*—Nat. ord. *Compositæ semiflosculosæ.*

Common dandelion.

Off.—Herba Leont. tarax. *Ed.* Folia tarax. *Dub.*
Radix Leont. tarax. *Ed.* Radix tarax. *Lond. Dub.*
The root and leaves.

THIS perennial plant is very common in grass fields and uncultivated places. It flowers from April to July. The whole plant contains a bitter milky juice, which, however, is most abundant in the roots before the flower-stem shoots. The bitterness is destroyed by drying, and therefore the recent roots only should be used.

Medical use.—Its vulgar name Piss-a-bed shews a popular belief of its possessing diuretic properties; and it was lately a very fashionable remedy in Germany, given in the form of an expressed juice or decoction, or extract prepared from either of them; but it seems to be merely a mucilaginous bitter.

LICHEN ISLANDICUS. *Dub. Lond.*

Murray, g. 1202. *sp.* 50. *Cryptogamia, algæ, lichenes.*

Iceland moss. Eryngo-leaved liverwort.

Off.—Lichen Island. *Dub.* Lichen. *Lond.*

This is a perennial lichen, very common in Iceland, but also found in the forests and dry sterile woods of Switzerland and Germany, growing upon stones and on the earth. It has dry coriaceous leaves, divided into lobes and laciniæ, which are again notched and subdivided, with elevated margins, beset with short, very minute, rigid, parallel hairs, and marked with white spots, reddish towards the points. Amongst the leaves are found peltated, somewhat excavated, shining, viscid bodies, internally of a brown colour: these are the pericarpiums. When fresh, the colour of this lichen is greenish yellow, or greyish brown; but when dried, greenish white or grey. In Sweden principally, and in Germany, a variety is found, with smaller, tenderer, crisper leaves, destitute of hairs on the margin, of a paler lead colour, orange beneath. It is gathered in rainy weather, because it is then more easily detached from the stones. In the countries where it abounds, it is used for the nourishment both of cattle and of man. Mr. Proust has analyzed it with much success. A pound of dry lichen immersed in cold water soon resumed its fresh colour, and weighed two pounds two ounces, gave out a pale fawn colour to the water, but none of its bitterness. When previously powdered, it gives out a bitter, pale, yellow juice, losing about three per cent. in cold, and six in boiling water. This bitterness resides in an extractive which is employed in Iceland to dye a brown colour. By boiling lichen a quarter of an hour, it becomes sufficiently tender for use as an esculent vegetable. Lichen cooked in this manner has a kind of membranous elasticity, peculiar to some of the algæ and fungi; and after being dried, has only to be moistened with boiling water to resume this elasticity. Its appearance is not very prepossessing, having an unequal yellow colour, and a slight marine smell. A pound of dry lichen by boiling weighs three pounds, and when dried again, is reduced to two thirds of a pound.

The decoction has a clear yellow colour, and a slightly bitter taste, which, even when made with eight waters, on cooling becomes a tremulous jelly, without any viscidity. This jelly on standing contracts, expresses the water, cracks, and dries into transparent angular fragments, of a deep red colour, insoluble in cold water, soluble in boiling water, from which it is precipitated by infusion of galls. By nitric acid it is converted into oxalic acid. The insoluble part dissolves readily in nitric acid, forming oxalate of lime and oxalic acid, and is converted into a gelatinous pulp by potass.

According to this analysis, one hundred parts of dried lichen give, of

Bitter extractive,	3
Matter soluble in hot water,	33
Matter insoluble in hot water,	64=100.

The last substance has much analogy with gluten, and the second with starch, particularly in the remarkable property of being precipitated by infusion of galls. It differs from it, however, in not being glutinous, and in the solid matter of the jelly contracting and separating from the fluid, as curd does from whey.

Medical use.—From the analysis of this lichen, it appears to consist principally of a nutritious substance, combined with a bitter; and on the combination of these, its medical virtues probably depend. It is used, according to Arnemann,

1. In cough with expectoration, threatening to terminate in consumption; after neglected catarrhs, the consequence of peripneumony, when the expectoration becomes more copious and purulent.
2. In emaciation from measles, (Schoenheide); from wounds and ulcers with great discharge, (Plenk); after salivation; and from actual ulcers in the lungs, when there is no fever, (Scopoli), especially after neglected colds, or from translated morbid matter. In a high degree of the disease it does little good, but the night sweats are diminished by it, (Millin). In pituitous phthisis it is of great service.
4. In hæmoptysis, (Frize).
5. In chincough, (Tode).
6. In diabetes, as a tonic and palliative remedy.

It is commonly exhibited in decoction with water, broth, or milk, after the bitter has been extracted from it by steeping it in warm water; or in substance, boiled in chocolate or cocoa, or made into a jelly with boiling water. Half an ounce, or an ounce, must be used daily, and continued for some time. Proust disbelieves its specific virtues, but recommends it strongly as an article of diet in times of scarcity, and as a very convenient antiscorbutic vegetable in long sea voyages.

LICHEN ROCELLA.

Cryptogamia, algæ, lichenes.
Orchill.

Off.—Litmus, Lacmus tinctorius. *Dub.*
Litmus, Turnsole.

This lichen is found in Guernsey and Portland island, but it is from the Canary islands that it is chiefly obtained. It is not sold in the state of the plant merely dried, but manufactured by the Dutch into a paste, called *Litmus, Orseille en pate.* It is sold in square masses, about an inch in length, and half an inch in breadth and thickness, hard and brittle, having the appearance of a violet coloured earth, with white spots. It has a violet smell, probably from the addition of orris root powder; and when tasted, speedily tinges the saliva, and gives a sense of heat in the mouth. This paste is prepared by making the lichen undergo a kind of fermentation in vats with urine and lime-water, forming the whole into a pulp, and then dividing it into squares to dry.

Litmus is chiefly used as a dye-stuff, and by chemists as a very valuable test of the presence of uncombined acids. I must frankly confess my ignorance of the grounds upon which the Dublin college have introduced it into their *Materia Medica*. The translator of their Pharmacopœia merely says, "It has been "used medicinally with an intention of allaying the tickling at-"tendant on phthisis, and in hysterical coughs."

LINUM.

Willd. g. 590. *Smith, g.* 163. *Pentandria Pentagynia.*—Nat. ord. *Gruinales.*

Sp. 1. *Willd. Smith.* LINUM USITASSIMUM. *Ed. Lond. Dub.* Common flax.

Off.—Lini usitat. semina. *Ed. Lond.* Lini semina. *Dub.*
———— oleum. *Ed.*
The seed, and oil expressed from the seed.

THIS valuable annual plant is said to have come originally from those parts of Egypt which are exposed to the inundations of the Nile. It now grows wild in the fields in the south of England, and is cultivated in large quantities. It flowers in July.

Linseed contains about one fifth of mucilage, and one sixth of fixed oil. The mucilage resides entirely in the skin, and is separated by infusion or decoction. The oil is separated by expression. It is one of the cheapest fixed oils; but is generally rancid and nauseous, and unfit for internal use. The cake which remains after the expression of the oil, contains the farinaceous and mucilaginous part of the seed, and is used in fattening cattle, under the name of Oil-cake.

Medical use.—Linseed is emollient and demulcent. The entire seeds are used in cataplasms. The infusion is much employed as a pectoral drink, and in ardor urinæ, nephritic pains, and during the exhibition of corrosive sublimate.

Sp. 26. *Willd.*; *sp.* 4. *Smith.* LINUM CATHARTICUM. *Dub. Lond.*

Purging flax. Mill-mountain.

Off.—Herba. The herb.

THIS is an annual indigenous plant, found wild on dry meadows and pastures. It flowers from June to August. An infusion in water or whey of a handful of the fresh herb, or a drachm of it in substance, when dried, is said to purge without inconvenience.

LOBELIA SYPHILLITICA. *Ed.*
Syngenesia Monogynia.—Nat. ord. *Campanaceæ.*
Blue cardinal flower.

Off.—Radix. The root.

THIS plant grows in moist places in Virginia, and bears our winters. It is perennial, has an erect stalk three or four feet high, blue flowers, a milky juice, and a rank smell. The root consists of white fibres about two inches long, resembles tobacco in its taste, which remains on the tongue, and is apt to excite vomiting.

Medical use.—Dr. Barton says, that it is considerably diuretic, and Mr. Pearson found, that it generally disagreed with the stomach, and seldom failed of affecting the bowels as a strong cathartic. It certainly possesses no power of curing syphilis; even the Indians, when they have the disease, are glad of an opportunity of applying to the whites.

LYTHRUM SALICARIA. *Dub.*
Willd. g. sp. Smith, g. sp. Dodecandria Monogynia.—Nat. ord. *Calycanthemæ.*
Purple-spiked Willowstrife, Loosestrife.
Off.—Herba, the herb.

THIS perennial plant is indigenous, and grows in marshes, and on the banks of rivers. The dried leaves have a herbaceous taste, somewhat astringent, and some give out a ropy mucilage. Hence it is difficult to swallow the powder mixed with water. An ounce of the plant yielded to Sagar three drachms of watery, and only two drachms and 24 grains of sprituous extract, and the former was more disagreeably austere and exsiccative.

The decoction of this plant has been long celebrated in Ireland in diarrhœas. In the same disease, it is a popular remedy in Sweden; and De Haen and Stork and others have given it with success in laxity of the intestines from an accumulation of sordes. After premising a purgative, a drachm or more of the powder may be given morning and evening, or three times a-day. A decoction also of the plant or root may be given in diarrhœa or dysentery. Its properties are evidently mucilaginous and astringent.

LYTTA VESICATORIA. *Lond.*
MELOE VESICATORIUS. *Ed. Dub.*
Insecta Cleoptera, Vesicantia. Syst. Nat. Gmelin, g. 2013.
Spanish fly. Blistering fly.

Off.—Lytta. *Lond.* Melöe Vesic. *Ed.* Cantharis. *Dub.*

THESE insects have a longish, green, and gold-shining body, with flexible green-striped elytera, which cover the whole back of the body, and conceal brown membranous wings. On their head they have two black articulated feelers. They are found on the fraxinus, sambucus, salix, ligustrum, &c. in Spain, Italy, France, and Germany. The largest come from Italy, but the Spanish cantharides are preferred. They are gathered by shaking the trees on which they are, and catching them on a cloth spread beneath it. They are then killed by the fumes of vinegar, and dried carefully in a stove. The melolontha vitis is sometimes found mixed in considerable numbers with the cantharides. They are easily distinguished by their almost square body; and as they do not stimulate the skin, they should be picked out before the cantharides are powdered.

The analysis of cantharides, notwithstanding the experiments of Thouvenel and Beaupoil, is still extremely imperfect. Lewis ascertained that their active constituent is entirely soluble, both in water and in alcohol; for extracts made with each of these solvents blistered, as far as could be judged, equally, and as effectually as cantharides in substance. Both the residua were inactive. Neumann got from 1920 grains, 920 watery, and afterwards 28 alcoholic extract; and inversely, 400 alcoholic, and 192 watery.

Medical use.—Cantharides have a peculiar nauseous smell, and an extremely acrid burning taste. Taken internally, they often occasion a discharge of blood by urine, with exquisite pain. If the dose be considerable, they seem to inflame and ulcerate the whole intestinal canal; the stools become mucous and purulent; the breath fetid and cadaverous; intense pains are felt in the lower belly; the patient faints, grows giddy, delirious, and dies. Applied to the skin, they first inflame, and afterwards excoriate the part, raising a more perfect blister than any of the acrid vegetables, and occasioning a more plentiful discharge of serum; but even the external application of cantharides is often followed by a strangury, accompanied with thirst and feverish heat.

The inconveniencies arising from the use of cantharides, whether taken internally, or applied externally, are best obviated by drinking plentifully of bland emollient liquids, such as milk, emulsions, &c. The specific property of counteracting cantharides ascribed to camphor has no foundation.

The internal use of cantharides is at all times doubtful, and requires the most prudent management. They have, however, been sometimes employed with success in dropsy, and in diseases of the urinary organs, arising from debility, especially gleet and leucorrhœa. They are given in substance, in very small doses, or in tincture.

Applied externally, they are one of our best and most powerful remedies. By proper management, they may be regulated so as to act as a gentle stimulus, as a rubefacient, or as a blister.

Blisters are applied,

1. To increase the activity of the system in general, by means of their irritation ;
2. To increase the activity of a particular organ ;
3. To diminish morbid action in particular organs, by means of the irritation which they excite in the parts to which they are applied.

They may be employed with advantage in almost all diseases accompanied with typhus fever, especially if any important viscus, as the brains, lungs, or liver, be at the same time particularly affected. In these cases, the blisters are not applied to the diseased organs themselves, but as near them as may be convenient. When we wish to excite action in any organ, the blisters are, if possible, applied directly to the diseased organ.

MALVA SYLVESTRIS. *Ed. Lond.*

Willd. g. 1290. *sp.* 43. *Smith, g.* 317. *sp.* 1. *Monodelphia Polyandria.*—Nat. ord. *Columniferæ.*

Common mallow.

Off.—Malvæ sylvestris herba, flos. *Ed.* Malva. *Lond.*
The leaves and flowers.

THIS is a perennial plant, common in Britain, under hedges, near footpaths, and among rubbish. It flowers from May to August.

The whole plant abounds with mucilage. The leaves were formerly of some esteem in food, for loosening the belly; at preſent decoctions of them are sometimes employed in dysenteries, heat, and sharpness of urine, and in general for obtunding acrimonious humours; their principal use is in emollient glysters, cataplasms, and fomentations.

MANGANESIUM. *Dub.*

Manganese ; the black oxide of Manganese.

THIS metallic oxide is now, for the first time, introduced into the materia medica. It is to be regretted that the Dublin college has given, as the officinal name of the oxide, that which scientifically belongs to the metal.

Manganese is found,

I. Metallic.
   1. Native manganese (Perouse).

II. Oxidized. Grey ore, containing its black oxide.
  1. Foliated grey ore.
  2. Radiated.
  3. Compact.
  4. Earthy.
III. Sulphuretted. The black ore.
IV. Carbonated. The red ore.

The varieties of the grey ore are the most common. It is found in greatest purity at Exeter, and at Howth near Dublin. It is chiefly used for destroying the colour which iron imparts to glass, and has hence been called Glass-maker's soap, and for preparing the oxymuriatic acid, now so much used in bleaching. The recent application of the same acid to the destruction of contagion, and to other medical purposes, has procured the black oxide of manganese a place in the list of the materia medica.

MARRUBIUM VULGARE. *Ed. Lond. Dub.*

Willd. g. 1111. *sp.* 8. *Smith, g.* 270. *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*
White horehound.

Off.—Marrubii vulgaris herba. *Ed.*
Marrubii albi folia. *Dub.*
Marrabium. *Lond.*
The leaves.

This is a perennial plant, which grows wild on road-sides, and among rubbish, and flowers in July. The leaves have a very strong, not disagreeable smell, and a roughish, very bitter taste. Neumann got from 480 grains, 270 watery, and 30 alcoholic extract, and inversely 150 alcoholic, and 140 watery. They promote the fluid secretions in general, and liberally taken, loosen the belly.

MEL. *Lond. Dub.*

Honey.

This is a well-known substance; and although it is most probably of vegetable origin, it is not procured in any quantity except as an animal excretion from the bee (apis mellifica). This industrious insect, in the summer-time, flies from flower to flower, to collect the sweet juice secreted in them. When sufficiently loaded, it returns to its hive, where it deposits the honey, as a winter's supply, in the cells of the comb it had prepared of wax to receive it. What change it undergoes in the body of the insect is unknown; but it is certain that honey varies very much, according to the nature of the plants from which it is collected.

In some situations, where poisonous plants abound, it is even deleterious.

The best honey is that which is freest from colour, and contains the largest grains when it concretes. For medical use, it should also be as free of flavour as possible. That obtained from young bees, and which flows spontaneously from the combs, is the purest and finest, and is known by the name of Virgin honey. When separated from the wax by expression, it is less pure; and there is another sort still inferior, obtained by heating the combs before they are put into the press.

Honey consists principally of sugar, but it also probably contains mucilage and an acid, and is often impregnated with the essential oil of the flowers from which the bees have gathered it, as in the perfumed honey of the Crimea. In some parts of Asia and America, poisonous honey is met with, from the bees feeding on poisonous flowers. Neumann exsiccated honey in the water bath: the vapour which arose, he says, took fire on the approach of a candle, and diffused its smell widely; and the liquor which was condensed was manifestly impregnated, both with the smell and taste of honey, and amounted to three ounces, from eight of honey. Dissolved in water, it undergoes the vinous fermentation, forming mead. Treated with alcohol, Proust says, it may be separated into two kinds, one liquid, and the other crystalline. Cavellazzi obtained crystals of sugar from it, by saturating its acid with carbonate of lime, and it is converted into oxalic acid by the action of nitric acid.

Medical use.—From the earliest ages, honey has been employed as a medicine. Besides the general properties of saccharine bodies, it possesses others peculiar to itself, probably depending on the presence of an acid. For internal use, sugar is commonly to be preferred, as honey, in some constitutions, produces gripes and colic pains. From its stimulus, however, it forms an excellent gargle, and facilitates the expectoration of viscid phlegm; and it is sometimes employed as an emollient application to abscesses, and as a detergent to ulcers. It is also preferable to sugar in forming electuaries, as it is not so apt to crystallize.

MELALEUCA LEUCADENDRON. *Ed.* MELALEUCA CAJUPUTI. *Lond.*

Murray, g. 1269. *sp.* 1. *Varietas latifolia. Polyadelphia Polyandria.*—Nat ord. *Hesperideæ.*

The cajeput tree.

Off.—Oleum volat. Mel. Leuc. *Ed.* Oleum Cajeputi. *Lond.*
Ol. Cajèput. *Dub.*
The essential oil.

The tree which furnishes the cajeput oil is frequent on the mountains of Amboyna, and the other Molucca islands. Drs. Maton and Smith have lately examined specimens of this tree, which correspond with Rumphius, tab. 17. vol. ii.; and, as an unclassified species, have named it Melaleuca cajeputi. But as Thunberg says it is got from the leucadendron, perhaps both species yield it. Indeed, Rumphius himself would lead us to the same opinion. The oil is obtained by distillation from the dried leaves, and is prepared in great quantities, especially in the island of Banda, and sent to Holland in copper flasks. As it comes to us, it is of a green colour, very limpid, lighter than water, of a strong smell, resembling camphor, and a strong, pungent taste, like that of cardamoms. It burns entirely away, without leaving any residuum. It is often adulterated with other essential oils, coloured with the resin of milfoil. In the genuine oil, the green colour depends on the presence of copper; for when rectified, it is colourless.

Medical use.—Like other aromatic oils, it is highly stimulating, and is principally recommended in hysteria, epilepsy, flatulent colic, and paralysis of the tongue. The dose is from one to four drops on a lump of sugar.

It is applied externally, where a warm and peculiar stimulus is requisite; and is employed for restoring vigour after luxations and sprains; and for easing violent pain in gouty and rheumatic cases, in toothach, and similar affections.

MELISSA OFFICINALIS. *Ed.*

Willd g. 1118. *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Balm.

Off.—Herba. The herb.

Balm is a perennial plant, which grows wild on the Alps and Pyrenees, and is frequently cultivated in our gardens. It has a pleasant smell, and a weak, roughish, aromatic taste. The young shoots have the strongest flavour; the flowers, and the herb itself, when old, or produced in very moist rich soils, or rainy seasons, are much weaker, both in smell and taste.

It is principally used in the form of a watery infusion, which is drunk in the manner of tea.

MENTHA.

Willd. g. 1102. *Smith. g.* 262. *Didynamia Gymnospermia*—Nat. ord. *Verticillatæ.*

Sp. 7. *Willd.*; *sp.* 3. *Smith.* Mentha Viridis. *Lond: Dub.* Spearmint.

Off.—Herba Menthæ viridis. *Lond.* Folia Menthæ Sativæ. *Dub.*
The plant.

Spearmint is perennial, and a native of Britain. It flowers in August. The leaves have a warm, roughish, somewhat bitter taste, and a strong, not unpleasant, aromatic smell. Their virtues are stomachic and carminative.

Sp. 13. *Willd.; sp.* 4. *Smith.* Mentha Piperita. *Ed. Dub.* var. *a*, *Lond.*
Mentha Piperitis. Dub.
Peppermint.

Off.—Mentha Piperita. *Ed. Lond.* Mentha Piperitis. *Dub.*
The plant.

This species of mint is also perennial, and a native of Britain, where it is cultivated in very great quantities, for the sake of its essential oil. It flowers in August and September. The leaves have a strong, rather agreeable smell, and an intensely pungent, aromatic taste, resembling that of pepper, and accompanied with a peculiar sensation of coldness.

Its predominant constituents are essential oil and camphor, both of which rise in distillation, and are combined in what is called Oil of Peppermint.

Medical use.—Peppermint is principally used as a carminative and antispasmodic. The distilled water is a domestic remedy for flatulent colic, and the essential oil is often given with advantage, in doses of a few drops, in cramps of the stomach.

Sp. 20. *Willd.; sp.* 12. *Smith.* Mentha Pulegium. *Ed. Lond. Dub.*
Penny-royal.

Off.—Mentha Pulegium. *Ed.* Pulegium. *Lond. Dub.*
The herb.

This is also perennial, and a native of Britain. It flowers in September. In its sensible qualities it is warm, pungent, and aromatic, somewhat similar to spearmint, but less agreeable. It is seldom used.

MENYANTHES TRIFOLIATA. *Ed. Lond. Dub.*
Willd. g. 299. *sp.* 4. *Smith, g.* 84. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Rotaceæ.*
Buckbean, Marsh trefoil.

Off.—Menyanthes trifoliata. *Ed.* Menyanthes. *Lond.* Trifolium paludosum. *Dub.*
The leaves.

THIS perennial plant is very common in marshy situations, and is one of the most beautiful of our native flowers. It flowers in June and July.

The leaves grow, by threes, on footstalks. They are excessively bitter, and their bitterness is extracted by infusion. They are said to be sometimes used in brewing ale, and that one ounce will go as far as half a pound of hops.

Medical use.—A drachm of them in powder purges and vomits. In infusion or extract, they have been recommended in intermittents, and in several cachetic and cutaneous diseases. The dose of the extract is from ten to twenty grains.

MIMOSA. *Lin.* ACACIA. *Willd. Lond.*

Polygamia Monoecia. Willd. g. 1902.—Nat. ord. *Lomentaceæ.*

I have not been able to procure the volume of Willdenow, on the authority of which the London college have referred the officinal Mimosa to a new genus, Acacia; but I should suppose that that eminent botanist had thought it necessary to subdivide the old genus. The references are taken from Dr. Powis's translation.

Sp. 73. MIMOSA CATECHU. *Ed.* ACACIA CATECHU. *Willd. Lond.*
Catechu.

Off.—Ligni Mimosæ catechu extractum. *Ed.*
Catechu extractum. *Lond.* Catechu. *Dub.*
The extract of the wood.

THIS tree is a native of Hindostan. The extract of catechu, which was formerly termed, with peculiar impropriety, Japan earth, is principally prepared from the internal coloured part of the wood, by decoction, evaporation, and exsiccation in the sun. But catechu is also prepared in India from several other species of Mimosa, and even from the woods, barks, and fruits of other genera.

There are two kinds of this extract; one is sent from Bombay, the other from Bengal. The extract from Bombay is of a uniform texture, and of a red-brown tint, its specific gravity being generally about 1.39. The extract from Bengal is more friable, and less consistent. Its colour is like that of chocolate externally; but when broken, its fracture presents streaks of chocolate and of red brown. Its specific gravity is about 1.28. Their tastes are precisely similar, being astringent, but leaving in the mouth a sensation of sweetness. They do not deliquesce, or apparently change by exposure to the air, and are not fusible.

By Mr. Davy's analysis, 200 grains gave,

	Bombay.	Bengal.
Tannin, - -	109	97
Peculiar extractive matter, -	68	73
Mucilage, - -	13	16
Residual matter, chiefly sand and calcareous earths, - -	10	14

This more exact analysis confirms the observations made by me, in the first edition of this Dispensatory.

Medical use.—Catechu is one of the most convenient and powerful astringents we possess, and may be exhibited in every case where astringents are indicated. It is particularly serviceable in diarrhœa, in hoarseness from relaxation of the fauces, ulcers and aphthæ in the mouth, and in excoriations, with lymphatic exudations.

Sp. 87. MIMOSA NILOTICA. *Ed. Dub. Acacia* vera *Willd. Lond.* Gum Mimosa.

Off.—Gummi Mimosæ Niloticæ. *Ed.*
Acaciæ gummi. *Lond.*
Gummi Arabicum. *Dub.*
The gum.

THIS species of Mimosa grows in the sandy deserts of Africa, Arabia Petræa, and Egypt. The greatest quantity of pure gum, commonly called Gum Arabic, is furnished by this tree, from which it exudes either spontaneously, or from incisions made into the bark, and afterwards hardens in the air. But a similar gum may be obtained from all the species of Mimosa, and from many other trees, such as the Swietenia febrifuga, Melia azadirachta, and the different species of Terminalia. It is remarkable that the barks of all the trees which furnish this bland mucilaginous substance are highly astringent; that of the Mimosa Nilotica itself is used in India for tanning; and in our country, the cherry and plum trees, which sometimes yield a little gum, have very astringent barks.

There are two kinds of gum found in the shops, and sold promiscuously; distinguished by the names of Gum Arabic, and East-India gum. Gum Arabic consists of roundish transparent tears, colourless, or of a yellowish colour, shining fracture, without smell or taste, and perfectly soluble in water. The pieces which are most transparent, and have least colour, are reckoned the best. They are sometimes selected from the Gum Arabic in sorts, and sold for about double the price, under the title of Picked gum. The East India gum is darker coloured than Gum Arabic, and is not so readily soluble in water. I possess a mass of gum, gathered from a Mimosa in New South Wales, by Mr.

Jamieson, who is engaged in preparing for the press a most splendid and scientific description of that country. It is darker coloured even than East India gum, and is also less soluble than it; for when suspended in water, it gives off white films, which float through the mucilage. But its most remarkable property is, that it does not precipitate silicized potass; in which respect it agrees, as far as my experiments go, with gum collected in this neighbourhood from the common cherry and plum trees. It is also remarkable, that the coarsest gum forms the thickest mucilage; at least Botany Bay gum forms a thicker mucilage than East India gum, and this than Gum Arabic.

Gum Arabic was originally brought from Arabia, by the way of Egypt, to Marseilles; and it was not until the beginning of the seventeenth century that the Dutch made the gum of Senegal known in Europe. After the French got possession of that river, they directed their attention to it, as an important object of commerce, and ascertained, by experiments made in the latter half of the seventeenth century, that gum Senegal was superior to the best gum of Arabia; and for about fifty years it has had the preference.

M. Adanson examined all the gum trees of West Africa with great care, and has given the best description of them. They amount to forty in number; but the three great forests which supply the Senegal market consist chiefly of two kinds; one which produces a white gum, called *Verick*, and another, called *Nebueb*, which yields a red gum.

About the middle of November, that is, after the rainy season, which begins early in July, a gummy juice exudes spontaneously from the trunk and principal branches. In about fifteen days, it thickens in the furrow, down which it runs, either in a vermicular shape, or more commonly assuming the form of round or oval tears, about the size of a pigeon's egg, of different colours, as they belong to the white or red gum-tree. About the middle of December, the Moors encamp on the borders of the forest, and the harvest lasts six weeks. The gum is packed in very large sacks of tanned leather, and brought on camels and bullocks to certain ports, where it is sold to the French and English merchants. In 1787, the annual quantity purchased by the former was about 800,000 pounds, and by the latter 400,000, according to the information of M. Golberry.

Mr. Jackson, in his Account of the Empire of Morocco, informs us, that from Mogodor they export two sorts of gum, one the common Gum Arabic, the produce of Morocco, and called Barbary gum; the other finer, called Gum Soudan, or Senegal, brought from Timbuctoo by the caravans. He also says, but it must be observed that he is no botanist, that the gum called Morocco or Barbary gum, is produced from a thorny tree called *Attaleh*, having leaves similar to the juniper, whereas all the acacias have prinnated leaves. It yields most gum during the hot and parching heat of July and August; and the hotter the weather, and the more sickly the tree appears, the more gum it yields. A wet winter and a mild summer are unfavourable to gum.

Gum is highly nutritious. During the whole time of the harvest, of the journey, and of the fair, the Moors of the desart live almost entirely upon it; and experience has proved that six ounces are sufficient for the support of a man during twenty-four hours.

Medical use.—It possesses the powers of a mucilaginous demulcent in a high degree; and is frequently exhibited in diarrhœa, dysentry, chincough, hoarseness, strangury, &c.; and is an extremely useful article for giving form to some remedies, and for correcting the acrimony of others.

M. Golberry says, that he saw a young Englishman in Gambia recover from a very severe hæmoptysis, by taking three ounces of gum daily dissolved in milk.

MOMORDICA ELATERIUM. *Ed.*

Monoecia Syngenesia. Willd. g. 1739. *sp.* 13.—Nat. ord. *Cucurbitaceæ.*

Wild cucumber.

Off.—Fructus recens submaturus Momordicæ elaterii. *Ed.*
Elaterii poma. *Lond.* Elaterii fructus. *Dub.*
The fresh fruit, when almost ripe.

THIS plant is a native of the south of Europe, and is perennial. When cultivated in this country it does not survive the winter. The fruit is oblong, about an inch and a half long, and an inch in diameter. It is of a green colour, and beset with stiff hairs. When nearly ripe, it bursts on a slight touch, separates from its stalk, and sheds its seeds with great violence. From this circumstance it was named by the Greeks *Elaterium*, which name was also applied to the fæcula of the juice of the fruit, the only preparation used in medicine.

Med. use.—In a few grains it operates as a drastic purgative, and is sometimes used in dropsies.

MORUS NIGRA.

Monoecia Tetrandria. Willd. g. 1664. *sp.* 5.—Nat. ord. *Scabridæ.*

Mulberry tree.

Off. Mori baccæ. *Lond.* The fruit.

THIS tree, which is supposed to have come originally from

Persia, bears the cold of our winters, and ripens its fruit in England. The fruit has the same properties with other subacid fruits. Its juice contains tartaric acid.

MOSCHUS MOSCHIFERUS.

Mammalia.
The musk deer.

Off.—Materia in folliculo prope umbilicum collecta, *Moschus* dicta. *Ed.*
Moschus. *Lond. Dub.*
The substance, called *Musk*, contained in a follicle situated near the navel.

THE musk animal is an inhabitant of the most elevated region of Asia, particularly of the Altayan Alps, and the mountains which divide Thibet from China. It is gentle and timid, and its chace is difficult and dangerous. It is about three feet in length, and in its general form resembles the deer tribe. In the male, behind the navel, and before the prepuce, there is situated an oval bag, flat on one side, and convex on the other, about three inches long, and two broad, projecting about an inch, and having a small open orifice, beset with short hairs. In the young animal it is empty, but in the adult it is filled with a secreted matter, known by the name of Musk. When the bag becomes too full, the animal expresses part of its contents, by rubbing itself against stones or trees. The musk expressed in this manner is said to be the purest, but none of it probably reaches this country. The best musk is brought from Tonquin, an inferior sort from Agria and Bengal, and a still worse from Russia.

Fine musk comes to us in round thin bladders, which are generally about the size of a pigeon's egg, covered with short brown hairs, lined with a thin brown membrane, well filled, and without any appearance of having been opened. The musk itself is dry, with a kind of unctuosity, of a dark reddish brown or rusty blackish colour, in small round grains, with very few hard black clots, and perfectly free from sandy, or other visible foreign matter. If chewed, and rubbed with a knife on paper, it looks smooth, bright, yellowish, and is free from grittiness. Laid on a red-hot iron, it catches flame, and burns almost entirely away, leaving only an exceedingly small quantity of light greyish ashes. The largest and fullest bag scarcely contains more than two drachms of musk.

Its taste is somewhat bitterish, and its smell extremely powerful and peculiar. Neumann got from thirty grains of musk twelve of watery and four of alcoholic extract; and inversely, ten of acoholic, and six of watery. Its smell and taste were elevated in distillation with water, but not with alcohol. Neither the fixed nor volatile oils dissolved it.

The very great price of musk has given rise to many modes of adulterating it. To increase its weight, sand, and even particles of lead, are introduced through very small openings into the bags. The real musk is frequently abstracted from the bag, and its place supplied with dry blood, coarsely powdered, or some mixture with asphaltum. These adulterations are to be detected by discovering that the bag has been opened. The presence of blood is also known by the fetid smell it emits when heated sufficiently, and by the formation of ammonia, when rubbed with potass. Asphaltum is known by its shining fracture, and melting on hot iron, while musk is converted into charcoal. But there are even artificial bags filled with a composition containing some real musk. These are in general thicker, and covered with longer hair, and want the internal brown membrane which lines the real musk-bag.

Medical use.—Musk is said to be a medicine of very great efficacy, and for which, in some cases, there is hardly any substitute. When properly administered, it sometimes succeeds in the most desperate circumstances. It raises the pulse, without heating much; it allays spasms, and operates remarkably on the brain, increasing the powers of thought, sensation, and voluntary motion.

It may be employed in every instance of typhous fever, especially when attended with delirium, or spasmodic affection of any particular organ, or of the whole system, or subsultus tendinum, &c. It is also used with the greatest benefit in exanthematous and phlegmonic diseases, accompanied with typhoid fever; and in many spasmodic affections, as chincough, epilepsy, trismus, &c.

It is most conveniently given in substance in powder, in doses of three grains or upwards, repeated every one or two hours. Its best preparation is the tincture.

MURIAS.

Muriate is the generic term for those secondary compounds which contain muriatic acid. Their general properties have been already mentioned.

The muriates may be divided into three families:

1. Alkaline muriates,—soluble in water, fusible and vaporizable without decomposition, forming no precipitate with alkaline carbonates.

2. Earthy muriates,—generally soluble in water, decomposable by heat, forming a white precipitate with alkaline carbonates.

3. Metalline muriates,—The muriatic acid is capable of combining with many metals, in two states of oxidizement. The muriates which contain the metal in the state of protoxide, are in general very acrid, and soluble both in water and in alcohol. The muriates which contain the metal in the state of peroxide are often insoluble, have a white colour, and contain an excess of base, or are sub-muriates. The muriates are also the most volatile of the metalline salts, and often rise undecomposed in sublimation or distillation.

MURIAS AMMONIÆ. *Ed. Lond.*
SAL AMMONIACUM. *Dub.*
Muriate of ammonia. Sal ammoniac.

MURIATE of ammonia is found native, especially in the neighbourhood of volcanoes. It was first prepared in Egypt from the soot of camel-dung by sublimation; but the greatest part of that now used is manufactured in Europe, either by combining ammonia directly with muriatic acid, or by decomposing the sulphate of ammonia, by means of muriate of soda; or the muriates of lime and magnesia, by means of ammonia.

In commerce, muriate of ammonia occurs, either sublimed in firm, round, elastic, concavo-convex cakes, or crystallized in conical masses. The latter commonly contain other salts, especially muriate of lime, which renders them deliquescent; and, therefore, the sublimed muriate of ammonia is to be preferred for the purposes of medicine.

Muriate of ammonia has an acrid, pungent, urinous taste. It is soluble in about three times its weight of water at 60°, and in an equal weight, at 212°. During its solution, it produces 32° of cold. It is also soluble in about 4.5 parts of alcohol. It is permanent in the ordinary state of the atmosphere. By a gentle heat, it may be deprived of its water of crystallization, and reduced to the form of a white powder. At a higher temperature it sublimes unchanged. Its crystals are either six-sided pyramids, aggregated in a plumose form, or still more commonly, four-sided pyramids. It consists of 42.75 muriatic acid, 25.00 ammonia, and 32.25 water. It is decomposed by the sulphuric and nitric acids; by baryta, potass, soda, strontia, and lime; by several secondary salts containing these acids or bases; and by those metalline salts whose bases form with muriatic acid an insoluble compound.

Medical use.—Muriate of ammonia is now seldom used internally. It was formerly supposed to be a powerful aperient and attenuant of viscid humours.

Externally applied, it is a valuable remedy. It may act in two ways,

1. By the cold produced during its solution.

It is from this cause that fomentations of muriate of ammonia probably prove beneficial in mania, apoplexy from plethora, lesions of the head, and in violent headachs. When used with this intention, the solution should be applied as soon as it is made.

2. By the stimulus of the salt.

On this principle we may explain its action as a discutient, in indolent tumours of all kinds, contusions, gangrene, psora, ophthalmia, cynanche, and in stimulating clysters. In some cases, as in chilblains, and other indolent inflammations, both modes of action may be serviceable. When first applied, the coldness of the solution will diminish the sense of heat and uneasiness of the part, and the subsequent stimulus will excite a more healthy action in the vessels.

MURIAS SODÆ. *Ed. Lond.*
SAL COMMUNE MURIAS SODÆ. *Dub.*
Muriate of soda. Common sea-salt.

THIS is is the most common of all the neutral salts. It is not only found in immense masses on and under the surface of the earth, and contained in great quantities in many salt springs, but it is the cause of the saltness of the sea.

There are two varieties of native muriate of soda, the lamellar and fibrous. It is found in Poland, Hungary, Spain, England, &c. When necessary, it is purified by solution and crystallization.

Salt springs occur in many parts of the world. The quantity of muriate of soda contained in these varies from an inconsiderable quantity even up to one third.

Sea-water also varies much in strength. It is said to contain most salt in warm climates, and at great depths.

Muriate of soda, as obtained from its natural solutions by evaporation and crystallization, is commonly mixed with earthy muriates, which, being deliquescent salts, dispose it to attract moisture from the atmosphere. It may, however, be purified by precipitating the earths by means of carbonate of soda, or by washing the crystallized salt with a saturated solution of muriate of soda, heated to ebullition. In this state it is not capable of dissolving any more muriate of soda, but will dissolve a considerable quantity of the earthy muriates.

Muriate of soda has a pure salt taste, is soluble in 2.8 times its weight of water at 60°, and in 2.76 at 212°. It is not soluble in alcohol. By the action of heat it first decrepitates, then melts, and, lastly, sublimes without decomposition. The primitive form of its crystals is cubic, and they are permanent in the atmosphere. According to Kirwan, they consist of 38.88 muriatic acid, 53 soda, and 8.12 water. It is decomposed by the sulphuric and nitric acids, by potass and baryta, by secondary salts containing these, and by metalline salts whose base forms an insoluble compound with muriatic acid; it is also gradually decomposed by lime, iron, and litharge.

Med. use.—Muriate of soda is one of the most important articles in the arts, and in domestic economy. As a medicine, it is useful in some cases of dyspepsia; and in large doses it is said to check vomiting of blood. It is a common ingredient in stimulating clysters, and is sometimes applied externally, as a fomentation to bruises, or in the form of bath, as a gentle stimulus to the whole surface of the body.

MYRISTICA MOSCHATA. *Ed. Dub. Lond.*

Willd. g. 1351. *sp.* 1. *Monoecia Monandria.*—Nat. ord. *Oleraceæ.*

The nutmeg tree.

Off.—Myristicæ moschatæ fructus nucleus, *Nux moschata* dictus; *Maci*, et ejus oleum volatile. *Ed.*
Myristricæ nuclei. *Lond.*
Nux moschata; oleum essentiale, oleum expressum, involucrum *Macis* dictum. *Dub.*
Nutmeg; oil of nutmeg; oil of mace; mace.

THE tree which furnishes this elegant spice is a native of the Molucca islands. It is not, however, cultivated in any of them except Banda, from which all Europe has been hitherto supplied with mace and nutmeg. The entire fruit is about the size of a peach, and is marked with a longitudinal furrow. The external covering is smooth, fleshy, and bitter. As the fruit ripens, this bursts, and discloses the mace, which is an oily membranous pulp, of a dark red colour, and aromatic flavour, divided into narrow branched slips. Within the mace is inclosed the nut, which consists of a brown, thin, hard shell, and a fatty parenchymatous kernel, of an oval shape. The fruit is gathered three times a-year. The external covering is separated on the spot, and the mace and nut carried home, where they are carefully dried in the sun. After they are dried, the nutmegs are dipt in lime water, and the mace is sprinkled with salt water, probably to preserve them from the attacks of insects.

Mace, by drying, acquires a reddish yellow colour. When good, it is flexible, thin, oily, of a deep colour, has a strong, agreeable smell, and an aromatic, bitterish, acrid taste. When brittle, divided into fewer slips, of a whitish, or pale yellow colour, and of little smell or taste, it is to be rejected.

Neumann got from 7680 parts of mace, 2160 alcoholic, and 1200 watery extract; and inversely, 1920 watery, and 1440 alcoholic extract, with 300 of volatile oil heavier than water, which arose during the inspissation of the watery extract. The expressed oil of mace is less consistent than that of nutmegs.

Nutmegs are oval, flattened at both ends, of a grey-brown colour, and reticularly furrowed on the outside, of a yellow colour within, variegated with brown undulating lines, solid, hard, unctuous to the feel, and easily cut with a knife; and have a balsamic smell, and agreeable aromatic taste. The small round nutmegs are better than the large oval ones; and they should have a strong smell and taste, and should neither be worm-eaten, musty, nor variegated with black lines. Their activity is, however, confined to the dark coloured veins, which are not apt to be worm-eaten.

Neumann got from 1920 parts of nutmeg, 480 of an oily alcoholic extract, and 280 watery, with 320 fixed oil: these two two last were both insipid: and inversely, 600 watery extract, with 50 of fixed oil, which rose to the surface during the inspissation, and 10 of volatile oil which distilled over; and afterwards, 120 unctuous alcoholic extract, and 300 more of fixed oil. By expression 1920 gave 540 of oil, and afterwards 480 of watery extract, a pretty strongly tasted distilled water, and 80 unctuous alcoholic extract, with 60 of insipid fixed oil.

Volatile oil of nutmeg. By distillation nutmegs yield a considerable quantity of essential oil, of a whitish yellow colour, lighter than water, and possessing the aromatic taste and smell in an eminent degree. In doses of a few drops, it is a powerful carminative and stomachic.

Expressed oil of mace. Nutmegs also yield by expression a considerable quantity of limpid yellow oil, which, on cooling, acquires a sabaceous consistence. They are first beaten to a soft paste in a warm mortar, then inclosed in a linen bag, exposed to the vapour of hot water, and squeezed in a press, of which the plates have been heated.

It is a mixture of the volatile oil on which their flavour depends, and of a fixed oil, of a white colour, without taste or smell; and as the properties which characterize it depend on the presence of the volatile oil, the denomination of Fixed oil, applied to it by the Edinburgh college, is less correct than that of Expressed oil, given to it by the Dublin college, from the manner of its preparation.

In the shops we meet with three sorts of unctuous substances called Oil of mace, though really expressed from the nutmeg. The best is brought from the East Indies, in stone jars; this is of a thick consistence, of the colour of mace, and an agreeable fragrant smell. The second sort, which is paler coloured, and much inferior in quality, comes from Holland, in solid masses, generally flat, and of a square figure. The third, which is the worst of all, and usually called Common oil of mace, is an artificial composition of suet, palm oil, and the like, flavoured with a little genuine oil of nutmeg. 7680 of the second sort yielded to Neumann 330 volatile oil heavier than water, 2880 of fluid expressible oil, and 4560 of solid, but fusible sebaceous matter, perfectly insipid, inodorous, and of a chalky whiteness.

Medical use.—Both mace and nutmegs are rather to be considered as aromatic spices, than as articles of medicine. From the essential oil they contain, they are heating and stimulating; and they are added to other medicines for the sake of their agreeable flavour.

MYROXYLON PERUIFERUM. *Ed. Lond. Dub.*

Willd. g. 829. *sp.* 1. *Decandria Monogynia*—Nat. ord. *Lomentaceæ.*

Sweet-smelling balsam tree.

Off.—Myroxyli Peruiferi balsamum, *vulgo* Balsamum Peruvianum. *Ed.*

Balsamum Peruvianum. *Lond. Dub.*
Peruvian Balsam.

THIS tree grows in the warmest provinces of South America, and is remarkable for its elegant appearance. Every part of it abounds with resinous juice, even the leaves are full of transparent resinous points, like those of the orange tree.

The balsam, as brought to us, is commonly of the consistence of thin honey, of a reddish-brown colour, inclining to black, an agreeable aromatic smell, and a very hot biting taste.

It is very often adulterated; and sometimes what is sold for Peruvian balsam, is a spurious mixture of resin and essential oil, flavoured with benzoin. These frauds are not easily detected, and fortunately they are of little importance.

It is said to be obtained by boiling the cuttings of the twigs in water, and skimming off with a spoon the balsam, which swims on the top.

By incision this tree yields a much more fragrant white or colourless balsam, which, when inspissated by the heat of the sun, forms the red or dry balsam of Peru; but it is very rarely used in Britain, and almost never to be met with in our shops.

Peruvian balsam consists of a volatile oil, resin, and benzoic acid; it is, accordingly, entirely soluble in alcohol, and in essential oils. Water dissolves part of the benzoic acid, and fixed oil combines with the resin. It may be suspended in water, by trituration with mucilage and yolk of egg.

Medical use.—Balsam of Peru is a very warm aromatic medicine, considerably hotter and more acrid than copaiva. Its effects are stimulating and tonic. Hence its use in some kinds of asthmas, gonorrhœas, dysenteries, suppressions of the uterine discharges, and other disorders proceeding from debility. It is also employed externally for cleansing and healing wounds and ulcers, and sometimes against palsies and rheumatic pains.

MYRRHA. *Ed. Lond. Dub.*
Myrrh.

Off.—Gumma-resina. The gum-resin of a non-descript tree.

THE tree which produces this gum-resin is not yet ascertained. Mr. Bruce has given some reasons for supposing that it is a mimosa; but we may observe, that all the mimosas, with which we are sufficiently acquainted, furnish a pure gum, and not a gum-resin. The best myrrh is brought from Troglodytitia, a province of Abyssinia, on the borders of the Red sea; but what we receive comes from the East Indies, and is produced on the eastern coast of Arabia Felix.

The best myrrh is in the form of tears, of a yellow, or reddish-yellow colour, becoming redder when breathed on; light, brittle, of an unctuous feel, pellucid, shining; presenting white semi-circular striæ in its fracture; of a very bitter aromatic taste, and a strong, peculiar, not unpleasant odour. It is not good if whitish, dark-coloured, black, resinous, ill-smelled, or mixed with impurities, which is too commonly the case.

Neumann ascertained that water and alcohol are both of them capable of taking up the whole of the taste and smell of the myrrh, the extract made by either after the other being insipid. The alcohol distilled from the tincture elevated none of the flavour of the myrrh; but during the inspissation of the decoction a volatile oil arose, containing the whole of the flavour of the myrrh, and heavier than water, while the extract was merely bitter. From 7680 parts of myrrh, he got 6000 watery extract, 180 volatile oil, and 720 alcoholic; and inversely, 2400 alcoholic, and 4200 watery. I have observed that the tincture is transparent, and when poured into water, forms a yellow opaque fluid, but lets fall no precipitate, while the watery solution is always yellow and opaque; and that myrrh is not fusible, and is difficulty inflammable. Mr. Hatchett found it soluble in alkalies.

Medical use.—Myrrh is a heating stimulating medicine. It frequently occasions a mild diaphoresis, and promotes the fluid secretions in general. Hence it proves serviceable in cachectic diseases, arising from inactivity of the system, and is supposed to act especially upon the uterine system, and to resist putrefaction.

It is exhibited,

1. In substance, in the form of powder, or made up into pills, in doses of 10 to 60 grains.
2. Dissolved in water, as in Griffiths' celebrated, but unchemical, myrrh mixture.
3. Dissolved in alcohol.

MYRTUS PIMENTA. *Ed. Lond. Dub.*

Willd. g. 973. *sp.* 28. *Icosandria Monogynia.*—Nat. ord. *Hesperideæ.*

Pimento tree.

Off.—Fructus Myrti Pimentæ, vulgo Piper Jamaicense. *Ed.*
Pimentæ baccæ. *Lond.*
Pimento (Piper Jamaicense) baccæ. *Dub.*
The fruit of the Pimento, commonly called Jamaica Pepper.

This is a native of Jamaica, and grows in all the woodlands on the north side. Soon after the trees have blossomed, the berries become fit for gathering; the fruit not being suffered to ripen, as in that state it is moist and glutinous, and therefore difficult to cure, and when dried becomes black and tasteless. The berries are dried by spreading them on a terrace, exposed to the sun for about seven days, during which time they gradually lose their green colour, and become of a reddish brown.

The smell of this spice resembles a mixture of cinnamon, cloves, and nutmegs; its taste approaches to that of cloves, or a mixture of the three foregoing; whence it has received the name of *allspice.*

Neumann ascertained that its flavour resides entirely in a volatile oil, heavier than water, and its pungency, in a resin or a substance, soluble in alcohol, and insoluble in water. From 480 parts, he got 120 watery extract, 30 volatile oil, and 20 alcoholic extract; and inversely, 66 alcoholic, and 100 watery.

Medical use.—Pimento is a warm aromatic stimulant, and is much used as a condiment in dressing food. As a medicine, it may be advantageously substituted for the more costly spices, especially in hospital practice.

NICOTIANA TABACUM. *Ed. Lond. Dub.*

Willd. g. 379. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ.*

Tobacco.

Off.—Nicotianæ tabaci folium. *Ed.*
Tabaci folia. *Lond.*
Nicotianæ folia. *Dub.*
The dried leaves.

Tobacco is an annual plant, a native of America, from whence it was first brought into Europe, about the year 1560. It is now sometimes cultivated, for medicinal use, in our gardens; but in general it is imported from America in large quantities. The leaves are about two feet long, of a pale green colour while fresh, and when carefully dried, of a lively yellowish tint. They have a strong, disagreeable, narcotic smell, and a very acrid burning taste.

The active constituent of tobacco is an essential oil; for, by long boiling, the decoction and extract of tobacco become almost inert; and, by distillation, an oil is obtained from it, so active, that small animals are almost instantly killed, when wounded by a needle dipped in it.

Medical use.—On the living body, whether taken into the stomach, in substance or solution, or into the lungs, in the form of smoke, or applied to abraded surfaces, tobacco is capable of producing deleterious effects. It often proves virulently cathartic or emetic, and occasions intolerable cardialgia, anxiety, and vertigo.

The system becomes easily habituated to the action of tobacco; and many people use very large quantities of it in several ways as a luxury, without experiencing any other bad effect than what arises from their being unable to relinquish it after the habit is confirmed.

As a medicine, it is exhibited in various forms:

1. In substance. When chewed, it causes an increased flow of saliva, and sometimes relieves the toothach; and reduced to powder, it proves an excellent errhine and sternutatory, when snuffed up the nostrils.
2. In infusion in water or wine. Taken in such small doses as to have little effect on the stomach, it proves powerfully diuretic, and was employed by Dr. Fowler, with very great success, in cases of dropsy and dysuria. It is also applied externally for the cure of psora, tinea, and other cutaneous diseases.
3. In the form of smoke, it is injected into the anus by means of bellows of a peculiar construction. By acting as a stimulus to the rectum, it sometimes succeeds in reviving the vital powers in some kinds of asphyxia, and in evacuating the intestines in cases of obstinate constipation.

NITRAS.

Nitrate is the generic term for secondary compounds, which consist of nitric acid, combined with any base. Their general characters have been already mentioned. There are three families of nitrates.

1. Alkaline nitrates;—soluble in water; solubility increased by increase of temperature; crystallizable; forming no precipitate with alkaline carbonates.

2. Earthy nitrates;—soluble in water; forming a white precipitate with alkaline carbonates.

3. Metallic nitrates; generally soluble, both in water and in alcohol; decomposable by heat, furnishing nitric oxide gas, and leaving the metal oxidized to a maximum.

NITRAS POTASSÆ. *Ed. Lond.*
NITRUM; NITRAS KALI. *Dub.*
Nitrate of potass. Purified nitre.

NITRATE of potass is annually produced on the surface of the earth in many countries. For this production, the presence of a calcareous base, heat, and an open, but not too free communication with dry atmospheric air, are requisite. The putrefaction of organic, especially animal substances, is not necessary to, but accelerates the formation of this salt, by affording the azote in a state in which it combines readily with the oxygen of the atmosphere, and forms the nitric acid. Accordingly, in Germany and France, nitrate of potass is prepared, by exposing mixtures of putrefying animal and vegetable substances, and calcareous earths, to the action of the atmosphere. The salt is afterwards extracted by lixiviation and crystallization. The nitre used in this country is chiefly imported from the East Indies. As it occurs in commerce, it often contains a little muriate of potass and muriate of soda, from which it is easily purified by dissolving it in boiling water, and filtering it; on cooling, the nitrate of potass crystallizes, and the other salts remain dissolved.

Nitrate of potass has a sharp, bitterish, cooling taste. It shoots in pretty large crystals, which are generally six-sided prisms, terminated by six-sided pyramids; very brittle; permanent in the atmosphere; soluble in seven times their weight of water at 60°, and in an equal weight at 212°; melting when exposed to a strong heat, giving out, at first oxygen, and afterwards nitrogen gas, until the whole acid be decomposed, and the potass alone remain behind. It deflagrates more or less violently with all oxygenizable substances, oxydizing or acidifying them. When dried in a temperature of 70°, it consists, according to Kirwan, of 44 nitric acid, 51.8 potass, and 4.2 water. It is decomposed by the sulphuric acid and baryta, by the muriate and acetite of baryta, and the sulphates of soda, ammonia, magnesia, and alumina.

Medical use.—Taken to the extent of from a drachm to half an ounce in the course of a day, in repeated doses, it diminishes the heat of the body, and the frequency of the pulse, operates by stool, and acts upon the secretion of urine, but is apt to produce pains in the stomach. In large doses, such as an ounce, taken at one time, it produces the most dreadful symptoms, constant vomiting, purging mixed with blood, convulsions, and death. Accidents of this kind have happened, from its being sold, by mistake, for sulphate of soda.

It is best given in small doses, as five to ten grains, frequently repeated, and is only admissable in inflammatory diseases. Externally it is used in gargles for inflammatory sore throats.

OLEA EUROPÆA. *Lond. Ed. Dub.*

Willd. g. 36. *sp.* 1. *Diandria Monogynia.*—Nat. ord. *Sepiariæ.*
The olive tree.

Off.—Oleæ Europææ oleum. *Ed.*
Olivæ oleum. *Lond.*
Oleum olivarum. *Dub.*
Olive oil. The fixed or expressed oil of the fruit.

The olive tree is a native of the south of Europe and north of Africa. It is cultivated in France, Spain, and Italy, for the sake of its fruit, and the oil expressed from it. Olives, when fresh, have an acrid, bitter, and extremely disagreeable taste; but they are only eaten when pickled. They are first steeped for several days in a ley of wood-ashes, and then pickled in a strong solution of muriate of soda.

They are principally valued for the oil they afford by expression.

For this purpose they are gathered when fully ripe, and immediately bruised, and subjected to the press. The finest oil flows first, and a very bad oil is obtained by boiling the magma, which remains after expression in water. According to Baumé, they are gathered when sufficiently ripe: they are then dried, to deprive the mucilage, of which they contain a large quantity, of its water, and are expressed after being bruised, and moistened with a little water, to render the oil more fluid. By rest, the mucilage and water which may have passed with it separate. Olive oil is sometimes mixed with oil of poppy seeds; but, by exposing the mixture to the freezing temperature, the olive oil freezes, while that of the poppies remains fluid; and as oils which freeze with most difficulty are most apt to become rancid, olive oil is deteriorated by the admixture of poppy oil.

Good olive oil should have a pale yellow colour, somewhat inclining to green, a bland taste, without smell, and should congeal at 38° Fahrenheit. In this country, it is frequently rancid, and sometimes adulterated.

Medical use.—Taken internally, it operates as a gentle laxative, and is given in cases of worms. It is also given in large quantities to mitigate the action of acrid substances taken into the stomach. It is used externally in frictions, in gargles, and in clysters; but its principal employment is for the composition of ointments and plasters.

ONISCUS ASELLUS. *Dub.*

Insecta aptera.

Off.—Millepedæ. *Dub.*
Slaters, killed by the vapour of alcohol.

These insects are found in cellars, under stones, and in cold moist places; in warm countries they are rarely met with. They have a faint disagreeable smell, and a somewhat pungent, sweetish, nauseous taste.

Neumann got from 480 parts 95 watery, and ten alcoholic extract; and inversely 52 alcoholic, and 45 watery. Nothing rose in distillation with either.

Their medical virtues have been very much over-rated.

ORIGANUM.

Willd. g. 1116. *Smith*, g. 273. *Didynamia Gymnospermia.* Nat. ord. *Verticillatæ.*

Sp. 10. *Willd. sp.* 1. *Smith.* Origanum Vulgare. *Lond. Dub.*

Common marjoram.

Off.—Origanum. *Lond.*
Origani folia. *Dub.*
The herb.

This is a perennial plant, which is met with upon dry chalky hills, and in gravelly soils, in several parts of Britain, and flowers in July and August. It has an agreeable smell, and a pungent taste, warmer than that of the garden marjoram, and much resembling thyme, with which it seems to agree in virtue. An essential oil distilled from it is kept in the shops, and is very acrid.

Sp. 15. *Willd.* Origanum Marjorana. *Ed. Dub.*

Sweet marjoram.

Off.—Herba Origani Marjoranæ. *Ed.*
Herba Marjoranæ. *Dub.*
The plant.

Sweet marjoram is an annual plant, which grows wild in

Portugal, but is cultivated in our gardens, principally for culinary purposes. It is a moderately warm aromatic, yielding its virtues both to aqueous and spiritous liquors by infusion, and to water in distillation.

OSTREA EDULIS. *Lond.*
Cl. Vermes.—Ord. *Testacea.*
Oyster.

Off.—Testæ. *Lond.* The shell.

The oyster is a very nutritious article of diet, and in some diseases not only admissable, but even advantageous. Their shells, which are officinal, are composed, like all other mother-of-pearl shells, of alternate layers of carbonate of lime, and a thin membranaceous substance, which exactly resembles coagulated albumen in its properties. By burning, this membrane is destroyed, and the shells are converted into lime, which, although very pure, possesses no advantage over that of the mineral kingdom.

OVIS ARIES. *Lond. Dub. Ed.*
Cl. Mammalia.—Ord. *Ruminantia.*
The sheep.

Off.—Sevum. *Lond. Dub.*
Adeps Ovis Arietis. *Ed.*

Mutton is a highly nutritious and wholesome food. Ewe-milk is thick and heavy, and contains much cream and little whey. The cheese made from it has a bitter, biting taste, especially when old, and is supposed to be stomachic. Mutton-suet is officinal, for the purpose of giving consistency to some ointments and plasters.

OXALIS ACETOSELLA. *Lond.*
Willd. g. 918. *sp.* 25. *Smith, g.* 217. *sp.* 1. *Decandria Pentagynia.*—Nat. Ord. *Gruinales.*
Common wood-sorrel.

Off.—Folium Acetosellæ. *Lond.* The leaves.

This is a small perennial plant, which grows wild in woods, and under shady hedges, and flowers in April and May. The leaves contain a considerable quantity of super-oxalate of potass, and have an extremely pleasant acid taste. They possess the same powers with the vegetable acids in general, and may be given in infusion, or beaten with sugar into a conserve, or boiled with milk, to form an acid whey. The super-oxalate of potass is extracted in large quantities from them, and sold under the name of *Essential Salt of Lemons.*

Twenty pounds of the fresh leaves yielded to Neumann six pounds of juice, from which he got two ounces two drachms, and a scruple of salt, besides two ounces and six drachms of an impure saline mass.

PAPAVER.

Willd. g. 1015. *Smith, g.* 243. *Polyandria Monogynia.*—Nat. ord. *Rhœades.*

Sp. 5. *Willd. sp.* 4. *Smith.* PAPAVER RHOEAS. *Lond. Dub.*
Corn-rose, or red poppy.

Off.—Petala Rhœados. *Lond.*
Petala Papaveris erratici. *Dub.*
The flower.

THIS species of poppy is annual, and very common in our corn fields. It flowers in June and July, and the petals give out a fine red colour when infused, and are supposed to possess slightly anodyne powers.

Sp. 7. *Willd. sp.* 8. *Smith.* PAPAVER SOMNIFERUM. *Ed. Lond. Dub.*
White Poppy.

Off.—Capsulæ Papaveris somniferi. *Ed.*
Capsulæ Papaveris albi. *Dub.*
Papaveris Capsulæ. *Lond.*
Poppy heads.

THE white poppy is also an annual, and is sometimes found wild in this country, but it is probably originally a native of the warmer parts of Asia. It flowers in July, and is frequently cultivated for the beauty and the variety of its flowers, and for its seeds. Some attempts have been made in this country to obtain opium from its capsules; and Mr. Ball received a premium from the society for encouraging the arts, for specimens of British opium, in no respect inferior to the best eastern opium. But we apprehend that the climate of this country is an insuperable obstacle to its becoming a profitable branch of agriculture.

The leaves, stalks, and capsulses of the poppy, abound with a narcotic milky juice, which is partially extracted, together with a considerable quantity of mucilage, by decotion. The liquor, strongly pressed out, suffered to settle, clarified with whites of eggs, and evaporated to a due consistence, yields about one fifth, or one sixth of the weight of the heads, of extract, which possesses the virtues of opium in a very inferior degree, and does not come to this country, unless when used to adulterate the genuine opium.

A strong decoction of the dried heads, mixed with as much sugar as is sufficient to reduce it into the consistence of a syrup, becomes fit for keeping in a liquid form, and is the only officinal preparation of the poppy. It is, however, a very unequal preparation, as the real quantity of opium it contains is very uncertain, and as a medicine, it is by no means equal to syrup, to which a certain quantity of solution of opium is added.

The seeds of the poppy are simply emulsive, and contain none of the narcotic principle. They yield a considerable quantity of fixed oil by expression.

Off.—OPIUM. *Ed. Lond. Dub.*
Turkey opium; the concrete juice of the capsules before they are ripe.

Opium is the inspissated juice of the poppy. In the evening several superficial longitudinal incisions are made in the capsules, when they are almost ripe, with a knife having from three to five blades. The juice which exudes during the night, next day, after it has been thickened by the heat of the sun, is collected by means of iron scrapers, and put into an earthen pot. The operation is repeated as long as the heads furnish juice in sufficient quantity, and the opium is worked into masses with a wooden spatula, in the heat of the sun, until it acquires the due degree of thickness, when the masses are covered with poppy or tobacco leaves.

Two kinds of opium are found in commerce, distinguished by the names of Turkey and East-India opium.

Turkey opium is a solid compact substance, possessing a considerable degree of tenacity; when broken, having a shining fracture and uniform appearance; of a dark brown colour; when moistened, marking on paper a light brown interrupted streak, and becoming yellow when reduced to powder; scarcely colouring the saliva when chewed, exciting at first a nauseous bitter taste, which soon becomes acrid, with some degree of warmth; and having a peculiar heavy disagreeable smell. The best kind is in flat pieces, and besides the large leaves in which it is enveloped, is covered with the reddish capsules of a species of rumex, probably used in packing it. The round masses which have none of the capsules adhering to them, are evidently inferior in quality. Opium is bad if it be soft, or friable, mixed with any impurities, have an intensely dark or blackish colour, a weak or empyreumatic smell, a sweetish taste, or draw upon paper a brown continuous streak.

East-Indian opium has much less consistence, being sometimes not much thicker than tar, and always ductile. Its colour is much darker; its taste more nauseous, and less bitter; and its smell rather empyreumatic. It is considerably cheaper than

Turkish opium, and is supposed of only half the strength. One eighth of the weight of the cakes is allowed for the enormous quantity of leaves with which they are enveloped. In the East Indies, when opium is not good enough to bring a certain price, it is destroyed under the inspection of officers.

Opium is not fusible, but is softened even by the heat of the fingers. It is highly inflammable. It is partially soluble, both in alcohol and in water. Neumann got from 1920 parts of opium, 1520 alcoholic, and afterwards 80 watery extract, 320 remaining undissolved; and inversely 1280 watery, and 200 alcoholic extract, the residuum being 440.

The solutions of opium are transparent, and have a brown or vinous colour. The watery solution is not decomposed by alcohol. A small quantity of matter, which, as far as my experiments go, is neither fusible nor remarkably inflammable, is separated from the alcoholic solution by water. I have also observed that the watery solution of opium, and the alcoholic, after it has been precipitated by water, does not redden vegetable blues, is not precipitated by acids or alkalies, but is precipitated copiously by carbonate of potass, muriate and super-nitrate of mercury, oxymuriate of tin, sulphate of copper, sulphate of zinc, acetate of lead, nitrate of silver, and red sulphate of iron. The precipitate in the last case was of a dirty brown colour, not resembling those by alkaline or astringent substances, The solutions of opium, especially the watery, are also copiously precipitated by infusion of galls. This precipitate seems to resemble that produced by cinchonin, and to be different from that produced by gelatine.

The narcotic virtues of opium are imparted by distillation to alcohol and to water, and they are diminished, or entirely dissipated, by long boiling, roasting, or great age. The part of opium which is not soluble either in water or in alcohol, is albumen, according to Gren; caoutchouc, according to Buchholtz; a virulent glutinous substance, according to Josse; and Proust says it contains wax. From experiments made some years ago, I concluded that it was perfectly similar to the gluten of wheat flour, or fibrine. Long ago it was proposed to separate the resinous parts of opium by the same process that the fibrine of wheat flower is obtained. The fact is, that if Turkey opium be kneaded in a large quantity of water, the soluble parts are removed, and there remains in the hand an adhesive plastic mass, of a paler colour, not fusible, but becoming ductile when immersed in hot water, inflammable, imparting some colour to alcohol, but not soluble in it. East-India opium, treated in the same way, is entirely dissolved or diffused in the water, and leaves no plastic mass in the hand.

Upon the whole, it appears that the active constituent of opium, though not perfectly understood, is of a volatile nature, but sometimes fixed by its combination with the other constituents; that it is soluble both in water and in alcohol; that it is dissipated in the processes recommended for purifying opium by solution and evaporation; and that the attempts made by some pharmaceutists, to obtain a preparation of opium, which should possess only its sedative, without its narcotic effects, only succeeded in so far as they diminished its activity.

By evaporating a watery solution of opium to the consistence of a syrup, Derosne obtained a precipitate, which was increased by diluting it with water. He dissolved this in hot alcohol, from which it again separated on cooling. When purified by repeated solutions, it crystallized in rectangular prisms, with rhomboidal bases, had no taste or smell, was insoluble in cold water, and soluble in 400 parts of boiling water, did not affect vegetable blues, was soluble in 24 parts boiling alcohol, and 110 cold; soluble in hot ether and volatile oils, and separated from them as they cooled; very soluble in all acids, and highly narcotic. These observations are curious, and the experiments deserve to be repeated.

Medical use.—The action of opium on the living system has been the subject of the keenest controversy. Some have asserted that it is a direct sedative, and that it produces no stimulant effects whatever; while others have asserted as strongly, that it is a powerful, and highly diffusible stimulus, and that the sedative effects, which it undeniably produces, are merely the consequence of the previous excitement. The truth appears to be, that opium is capable of producing a certain degree of excitement, while the sedative effects which always succeed, are incomparably greater than could be produced by the preceding excitement. The stimulant effects are most apparent from small doses. These increase the energy of the mind, the frequency of the pulse, and the heat of the body, excite thirst, render the mouth dry and parched, and diminish all the secretions and excretions, except the cuticular discharge, which they increase. These effects are succeeded by languor and lassitude. In larger doses, the stimulant effects are not so apparent; but the excitability is remarkably diminished, and confusion of head, vertigo, and sleep, are produced. In excessive doses it proves a violent narcotic poison, producing headach, vertigo, delirium, and convulsions, accompanied with a very slow pulse, stertorous breathing, and a remarkable degree of insensibility or stupor, terminated by apoplectic death. In one case, where I inspected the body after death, the inner membrane of the stomach was remarkably corrugated, and with some inflammation; but as large doses of sulphate of zinc, and flour of mustard had been also taken, no inference can be drawn from these appearances. The bad effects of an over-dose of opium are often prevented by the occurrence of vomiting, and they are best counteracted by making the patient drink freely of acids and coffee, and not permitting him to yield to his desire of sleeping. By habit, the effects of opium on the body are remarkably diminished. There have been instances of four grains proving fatal to adults, while others have been known to consume as many drachms daily. The habitual use of opium produces the same effects with habitual dram drinking; tremors, paralysis, stupidity, and general emaciation, and like it can scarcely ever be relinquished.

In disease, opium is chiefly employed to mitigate pain, diminish morbid sensibility, procure sleep, allay inordinate actions, and to check diarrhœas, and other excessive discharges. It is contraindicated in gastric affections, plethora, a highly inflammatory state of the body, and determination of the blood to particular viscera.

In intermittents, it is said to have been used with good effect in every stage. Given even in the hot stage, it has been observed to allay the heat, thirst, headach, and delirium, to induce sweat and sleep, to cure the disease with less bark, and without leaving abdominal obstructions or dropsy.

In fevers of the typhoid type, accompanied with watchfulness or diarrhœa, it is extremely useful; but when not indicated by particular symptoms, it does harm, by augmenting thirst, and producing constipation.

Especially when combined with calomel, it has lately been much employed in inflammations from local causes, such as wounds, fractures, burns, absorption of morbid poisons, as in swelled testicle, &c. and even in active inflammations, accompanied with watchfulness, pain, and spasm, after blood-letting.

In small-pox, when the convulsions before eruption are frequent and considerable, or when the accompanying fever is of the typhoid type, opium is liberally used. It is likewise given from the fifth day onwards; and is found to allay the pain of suppuration, to promote the ptyalism, and to be otherwise useful.

In dysentery, after the use of gentle laxatives, or along with them, opium, independently of any effect it may have on the fever, is of consequence in allaying the tormina and tenesmus, and in obviating that laxity of bowels which so frequently remains after that disease.

In diarrhœa, the disease itself generally carries off any offending acrimony, and then opium is used with great effect. Even in the worst symptomatic cases, it seldom fails to alleviate.

In cholera and pyrosis, it is almost the only thing trusted to.

In colic, it is employed with laxatives; and often prevents ileus and inflammation, by relieving the spasm. Even in ileus it is sometimes used to allay the vomiting, the spasms, and the pain.

It is given to allay the pain, and favour the descent of calculi, and to give relieve in jaundice and dysuria proceeding from spasm.

It is of acknowledged use in the different species of tetanus; affords relief to the various spasmodic symptoms of dyspepsia, hysteria, hypochondriasis, asthma, rabies canina, &c. and has been found useful in some kinds of epilepsy.

In syphilis it is only useful in combating symptoms; and in counteracting the effects resulting from the improper use of mercury, for it possesses no power of overcoming the venereal virus.

It is found useful in certain cases of threatened abortion and lingering delivery, in convulsions during parturition, and in the after-pains and excessive flooding.

The administration of opium to the unaccustomed, is sometimes very difficult. The requisite quantity is wonderfully different in different persons, and in different states of the same person. A quarter of a grain will in one adult produce effects which ten times the quantity will not do in another; and a dose that might prove fatal in cholera or colic, would not be perceptible in many cases of tetanus or mania. When given in too small a dose, it is apt to produce disturbed sleep, and other disagreeable consequences; but sometimes a small dose has the desired effect, while a larger one gives rise to vertigo and delirium, and with some constitutions it does not agree in any dose or form. Its stimulant effects are most certainly produced by the repetition of small doses, its anodyne by the giving of a full dose at once. It some it seems not to have its proper effect till after a considerable time. The operation of a moderate dose is supposed to last in general about eight hours from the time of taking it.

Externally, opium is used to diminish pain, and to remove spasmodic affections. It is found particularly serviceable in chronic ophthalmia, when accompanied with morbidly increased sensibility.

Opium may be exhibited,

1. In substance, made up in the form of a pill, lozenge, or electuary. Its most efficient form.
2. Dissolved in diluted alcohol, or white wine.
3. Dissolved in water, or watery fluids. Very perishable.
4. Dried and reduced to powder.

It is often given in combination with aromatics, astringents, emetics, bitters, camphor, soap, distilled waters, mucilage, syrups, acids, carbonate of ammonia, ether, acetate of lead, tartrate of antimony and potass, and unctuous substances. Some of these are certainly unchemical mixtures, for I find by experiment that the solutions of opium are copiously precipitated by astringents, the alkaline carbonates, and all the metallic salts.

PASTINACA OPOPONAX. *Lond.*

Willd. g. 558. *sp.* 3. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Opoponax.

Off.—Opoponax; gummi resina. *Lond.*

A gum-resin.

This plant is perennial, and grows wild in the south of Europe; but the gum-resin, which is said to be obtained by wounding the stalk or root, is brought from the Levant and East-Indies, sometimes in round drops or tears, but more commonly in irregular lumps, of a reddish-yellow colour on the outside, with specks of white, inwardly of a paler colour, and frequently variegated with large white pieces. It has a peculiar strong smell, and a bitter, acrid, somewhat nauseous taste.

Neumann got from 480 parts, 166 alcoholic, and afterwards 180 watery extract; and inversely, 226 watery, and 60 alcoholic. Both the water and alcohol distilled from it were impregnated with its flavour. It forms a milky solution with water, and yields a little essential oil on distillation. It is supposed to be emmenagogue, but is rarely used.

PHASIANUS GALLUS. *Lond.*

Cl. Aves. ord. *Gallinæ.*

The dung-hill fowl.

Off.—Ovum. *Lond.*

The egg.

From what country this useful bird originally came, is not ascertained. It is now domesticated almost everywhere, and furnishes one of the most wholesome and delicate articles of food.

The egg only is officinal. The shell consists principally of carbonate of lime, with a small quantity of phosphate of lime and animal matter. When burnt, the animal matter and carbonic acid are destroyed, and we obtain a lime, mixed with a little phosphate of lime.

The contents of the egg consist of two substances, the white and the yolk. The white is albumen combined with a little soda and sulphur. The yoke is also albuminous, but contains moreover a bland oil, and some colouring matter. The yolk is sometimes used in pharmacy for suspending oily and resinous substances in water. The white is used for clarification.

PHYSETER MACROCEPHALUS. *Ed. Lond. Dub.*

Cl. Mammalia. Ord. *Cetacea.*
Spermaceti-whale.

Off.—Materia in cranio reperta SPERMACETI dicta. *Ed.*
CETACEUM; concretum sui generis. *Lond.*
SPERMACETI; sevum.

THE spermaceti whale is characterised by his enormous head, great part of which is occupied by a triangular cavity of bone, covered only by the common integuments. In the living animal, this cavity is filled with a white, fluid, oily, substance, amounting sometimes to many tons in weight. On the death of the whale, it congeals into a white unctuous mass, from which a considerable quantity of very pure whale oil is obtained by expression. The residuum, afterwards freed from impurities, by washing with water, melting, straining, expression through linen bags, and, lastly, washing in a weak ley of potass, is the peculiar substance well known by the name of *Spermaceti*, for which, probably on account of its conveying an incorrect idea of the nature of the substance, the London college has substituted *Cetaceum.* It is also contained in solution in the common whale and other fish-oils; for it is often found deposited, by crystallization, in the reservoirs containing them.

The chemical properties of spermaceti have been already noticed. As a medicine, for internal use, it agrees with the fixed vegetable oils; and in the composition of ointments, &c. its place may be very well supplied by a mixture of oil and wax.

PIMPINELLA ANISUM. *Ed. Lond. Dub.*

Willd. g. 562. sp. 8. Pentandria Digynia.—Nat. ord. *Umbellatæ.*
Anise.

Off.—Semina Pimpinellæ Anisi. *Ed.*
Semina Anisi. *Lond. Dub.*
The seeds.

ANISE is an annual umbelliferous plant, growing wild in Crete, Syria, and other places of the East. It is cultivated in some parts of France, Germany, and Spain, and may be raised also in England; the seeds brought from Spain, which are smaller than the others, are preferred.

Aniseeds have an aromatic smell, and a pleasant warm taste, accompanied with a degree of sweetness. Water extracts very little of their flavour; rectified spirit the whole.

PINUS.

Willd. g. 1711. *Smith, g.* 408. *Monœcia Adelphia.*—Nat. ord. *Coniferæ.*

Sp. 1. *Smith, Willd.* PINUS SYLVESTRIS. *Ed. Lond. Dub.*
Scotch Fir.

Off.—*a. Resina empyreumatica Pini sylvestris*, Pix liquida *dicta. Ed.* Pix liquida. *Dub.* Pix liquida; *resina præparata. Lond.*
b. Terebinthina vulgaris, *resina liquida. Lond.* Terebinthina vulgaris, *resina. Dub.*
c. Terebinthinæ oleum; *Oleum e Terebinthina distillatum. Lond.*
d. Resina flava; *Residuum postquam oleum terebinthinæ distillatum est. Lond.* Resina alba. *Dub.* Resina Pini: *Resina ex variis pinis oleo volatili privata. Ed.*
Tar. Common Turpentine. Oil of Turpentine. Rosin.

Sp. 7. *Willd.* PINUS LARIX. *Ed. Lond. Dub.*
The Larch.

Off.—*a.* Resina liquida Pini laricis; *vulgo Terebinthina Veneta. Ed.* Terebinthina Veneta; *resina. Dub.*
b. Oleum volatile Pini laricis; *vulgo Oleum Terebinthinæ. Ed.*
Venice Turpentine; Oil of Turpentine.

Sp. 27. *Willd.* PINUS BALSAMEA. *Ed. Lond. Dub.*
The Hemlock fir.

Off.—Resina liquida pini balsameæ; *vulgo Balsamum Canadense. Ed.* Terebinthina Canadense; *resina liquida. Lond.* Balsamum Canadense. *Dub.*
Balsam of Canada; Canadian Turpentine.

Sp. 32. *Willd.* PINUS ABIES. *Ed. Lond. Dub.*
The Spruce-fir.

Off.—*a.* Resina sponte concreta Pini abietis, *vulgo Pix Burgundica. Ed.* Pix arida; *Resina præparata. Lond.* Pix Burgundica. *Dub.*
b. Abietis Resina; *Resina concreta. Lond.*
Burgundy Pitch. Common Frankincense.

THESE different species of fir are all natives of sandy situations. The first only grows wild in this country. They all abound in every part with resinous juice, which possesses the same general qualities, but present some varieties, according to the nature of the species and mode of preparation.

We may arrange the products,

1. Into those which exude spontaneously;
2. Into those procured by wounding the tree;
3. Into those procured by decoction; and,
4. Into those which are procured by the action of fire.

By exudation.

The pinus larix exudes a species of manna, called Briançon Manna, but it is not used; as, besides the saccharine matter, it evidently contains turpentine.

From the pinus abies, and also from the pinus sylvestris, in warm seasons and climates, a resinous juice exudes spontaneously, which hardens into tears by exposure to the air. It is the *Thus* of the old, and the Resina Abietis of the new London Pharmacopœias, or common frankincense. It is a solid brittle resin, brought to us in tears, or masses, of a brownish or yellowish colour on the outside; internally whitish, or variegated with whitish specks, of a bitterish, acrid, not agreeable taste, with little smell.

Real Burgundy pitch is collected, according to Tingry, from the Pinus picea, or spruce fir tree. The resinous juice which exudes from this species is less fluid and less transparent than the proper turpentines. It is collected by the peasants, strained through cloths, and put into barrels. If its consistence be too thick, it is mixed over the fire with a little turpentine and oil of turpentine.

By incision.

To obtain the products of the second kind, a series of wounds is made through the bark into the wood, beginning at the bottom, and rising gradually upwards, until a stripe of the bark, about nine feet high, be removed, which is commonly effected in about four years. The same operation is then repeated on the opposite side. The operation was then recommenced close to the edge of the former wound, which by this time is nearly closed. A tree worked in this manner will survive, and furnish turpentine for near a century. The juice, or turpentine, which flows from these wounds, during summer, is collected in a small cavity formed in the earth, at the bottom of the incisions, from which it is occasionally removed into proper reservoirs previous to its purification.

As the trees exude very little juice during cold weather, no new incisions are made in winter; but the old ones get covered with a soft resinous crust (called *barras*, when it is impure, and mixed with bits of bark, dust, and sand; *gallipot*, when collected with more care; or *white incense*, when it is allowed to remain so long exposed that it becomes resinified); which is scraped off, and also collected for subsequent purification. All these products are purified by liquefaction and filtration. They consist almost entirely of essential oil and a resin, and differ only in the proportions, the turpentine containing the largest proportion of oil, and the gallipot of resin. Although gallipot contains essential oil, the quantity is so small, that it is never subjected to distillation, but is purified by melting it with a very gentle fire, and filtrating it. By this process it still contains essential oil, and is often sold by the name of Burgundy pitch. If boiling water be added to it after it is strained, but while it is still fluid, and they be agitated together till the mass cools, we have a yellow resin, which, from still containing some essential oil, is preferred to that prepared, by a similar process, from the residuum of the distillation of turpentine. A simple mixture of gallipot and barras, made without heat, is often sold under the name of Burgundy pitch; but the mass resulting from this combination soon becomes friable. It has neither the unctuosity, viscidity, tenacity, nor smell which distinguish the real kind.

Turpentines, or fluid resinous juices obtained by incision, have different appellations, chiefly according to the country from which they are procured.

Balsam of Canada, from the *Pinus balsamea* and *Pinus Canadensis*.
Resina liquida Pini balsameæ. Ed. Terebinthina Canadensis. Lond. Balsamum Canadense. Dub.
Cyprian turpentine, from the *Pistacia terebinthus*.
Terebinthina Chia. Lond.
Strasburgh turpentine, from the *Pinus picea*.
Venice turpentine, from the *Pinus larix*.
Resina liquida Pini laricis. Ed. Terebinthina Veneta. Dub.
Common turpentine, from the *Pinus sylvestris*.
Terebinthina vulgaris. Lond. Dub.
Hungarian balsam, from the *Pinus sylvestris, var. Mughos*.
Carpatian balsam, from the *Pinus cembra*.

None of these are properly balsams; which term is now confined by chemists to those resinous substances which contain benzoic acid. The Edinburgh college have denominated them liquid resins, which is rather a description than a name. Perhaps the London college have done better in retaining Turpentine as a proper generic name for these resinous juices.

All these species of turpentine possess the same general properties. They are more or less fluid, with different degrees of transparency; of a whitish or yellowish colour; a penetrating smell, and a warm, pungent, bitterish taste. They are entirely soluble in alcohol, combine with fixed oil, and impart their flavour to water, but are not soluble in it. They are decomposed by a moderate heat, being separated into an essential oil and a resin, and are exceedingly inflammable, burning with a large white flame, and much smoke.

Each species has some peculiarities. The Canadian is reckoned the best, and next to it the Chian. They are more transparent, and have a more agreeable flavour than the other kinds. The common turpentine, as being the most offensive, is rarely given internally; its principal use is in plasters and ointments among farriers, and for the distillation of the essential oil.

Medical use.—Taken internally, they are active stimulants, open the bowels, and increase the secretion of urine, to which they give the smell of violets, even though applied only externally. In all cases accompanied with inflammation, they ought to be abstained from, as this symptom is increased, and not unfrequently occasioned by them. They are principally recommended in gleets, the fluor albus, and the like. Their dose is from a scruple to a drachm and a half. They are most commodiously taken in the form of a bolus, or blended with watery liquors, by the mediation of the yolk of an egg, or mucilage. They also may be given in the form of electuary, mixed with twice their weight of honey, and in the dose of a drachm of the compound twice or thrice a-day, or of clyster, half an ounce being well triturated with the yolk of an egg, and mixed with half a pound of gruel, or decoction of camomile.

By distillation turpentines are analysed into two products, a solid resin and a volatile oil.

Oil of Turpentine is officinal in the Edinburgh and London Pharmacopœias; by the Dublin college directions are given for its preparation. At Queensferry, in this neighbourhood, there is a considerable turpentine work; the turpentine used comes from America, and therefore it is not a product of any of the officinal species of pine.

Oil of turpentine is lighter than water, transparent, limpid, and volatile. It has a hot pungent taste, and a penetrating smell; is highly inflammable, and possesses all the other properties of essential oils.

It is remarkably difficult of solution in alcohol, although turpentine itself dissolves easily. One part of the volatile oil is indeed apparently taken up by seven of alcohol; but on standing, the greatest part of the oil falls to the bottom, a much larger quantity being necessary to retain it in solution.

Med. use.—As a medicine, it is highly stimulating and penetrating. Internally it acts as a diuretic or sudorific in very small doses. It has, however, been given in much larger doses, especially when mixed with honey. Recourse has principally been had to such doses in cases of chronic rheumatism, particularly in those modifications of it which are styled *sciatica* and *lumbago.* But it has not been often successful, and sometimes has had the effect of inducing bloody urine.

Externally, it often produces excellent effects as a discutient in indolent tumours; as a stimulus in paralysis of the extremities, and in bruises; as an antispasmodic, and as a styptic, when applied on compresses to the bleeding mouths of the vessels, as hot as the patient can bear it.

Resins. The residuum of the distillation gets different names, according to some peculiarities in its treatment. When the distillation is performed without addition, and continued until the whole essential oil be driven off, and there appear some traces of empyreuma, the residuum is Fidlers rosin, or Colophony; but if, while the mass is still fluid, a quantity of water be added, and throughly blended with the resin by long and constant agitation, it is then called Yellow rosin.

The under part of the cake of the residuum of the distillation resembles fidlers rosin, the action of the fire having entirely expelled the water and volatile oil, and rendered it slightly empyreumatic and transparent, while the upper part, from retaining some water, is opaque and yellow.

By decoction.

A fluid extract, prepared by decoction from the twigs of the pinus sylvestris, is the well-known essence of spruce, which, fermented with molasses and water, forms the fashionable and wholesome beverage of spruce beer.

By fire.

The last kind of products from the different species of fir is obtained by the action of fire. With this view, a conical cavity is dug out in the earth, communicating at the bottom with a reservoir. Billets or thin laths of wood are then placed, so as not only to fill the cavity, but to form a conical pile over it, which is covered with turf, and kindled at the top. The admission of air is so regulated, that it burns from above downwards, with a slow and smothered combustion. The wood itself is reduced to charcoal, and the smoke and vapours formed are obliged to descend into the excavation in the ground, where they are condensed, and pass along with the matters liquefied into the receiver. This mixture is denominated Tar. By long boiling, tar is deprived of its volatile ingredients, and converted into pitch.

Tar is a mixture of resin, empyreumatic oil, charcoal, and acetous acid. Its colour is derived from the charcoal; and the other properties in which it differs from a common resin, depend on the presence of acetous acid and empyreumatic oil. The acid itself is not only soluble in water, but also renders the empyreumatic oil more soluble.

Medical use.—Tar-water is a heating diuretic and sudorific remedy; but by no means so powerful, or so generally admissible, as it was represented by Bishop Berkeley. Tar is applied externally in tinea capitis and some other cutaneous diseases.

But the most remarkable production of the pine tribe is that of a real gum, entirely soluble in water, from a tree so resinous as the Pinus larix. It is prepared in the Ural larch forests, and exudes, according to Professor Pallas, from the interior parts of the wood when it is burning.

PIPER.

Willd. g. 74. *Diandria Trigynia.*—Nat. ord. *Piperitæ.*

Sp. 1. PIPER NIGRUM. *Lond. Ed. Dub.*
Black pepper.

Off.—Baccæ. *Lond.* Fructus. *Ed.* Baccæ semen. *Dub.*
The berry.

THE black pepper is the fruit of a shrubby creeping plant, which grows wild in the East Indies, and is cultivated, with much advantage to the fruit, in Java and Malabar. The berries are gathered before they are ripe, and are dried in the sun. They become black and corrugated on the surface; their taste is hot and fiery, and their smell slightly aromatic.

Neumann got from 7680 parts 4800 watery, and afterwards 180 alcoholic extract; and inversely, 1080 alcoholic, and 3640 watery. The principle on which its pungency depends, was soluble both in water and in alcohol, and was not volatile, for 7680 grains furnished about 150 of a very bland volatile oil. From this analysis Dr. Thomson's differs remarkably. By macerating it in alcohol, and distilling the tincture, he got a green volatile oil, having the whole flavour and pungency of the pepper. Besides this essential principle, he found it to contain an extractive and starch.

White pepper is the fruit of the same plant, gathered after it is fully ripe, and freed of its external coat by maceration in water. It is smooth on the surface, and less pungent than the black pepper.

Sp. 12. PIPER LONGUM, *Lond. Ed. Dub.*
Long Pepper.

Off.—Fructus. *Ed. Dub. Lond.*
The fruit.

THE plant which bears the long pepper is also a sarmentaceous climber. The berries are small round grains, disposed spirally in a long cylindrical head. They are gathered before they are ripe, and dried, and are the hottest of all the peppers.

The warmth and pungency of these spices are said to reside entirely in a resin; their aromatic odour in an essential oil. In medicine, they are sometimes employed as acrid stimulants; but their chief use is in cookery, as condiments.

PISTACIA.

Willd. g. 1782. *Dioecia Pentandria.*—Nat. ord. *Amentaceæ.*

Sp. 4. PISTACIA TEREBINTHUS. *Lond.*

Off.—Terebinthina Chia. *Lond.*
Chian turpentine.

THE shrub which yields this turpentine grows in India, the north of Africa, and south of Europe; but the turpentine is principally collected in the islands of Chios and Cyprus, by wounding the tree. It does not differ from the other turpentines in any thing material, except in its price.—See PINUS.

Sp. 6. PISTACIA LENTISCUS. *Ed. Lond.*

Off.—Resina Pistachiæ Lentisci. *Ed.* Mastiche. *Lond.*
The resin.

THIS species is a native of the same countries with the former. The resin is obtained principally in the island of Chios, by making transverse incisions into the tree, and allowing the juice to harden. It is brought to us in small, yellowish, semitransparent, brittle grains; of a smooth and shining fracture, softening when chewed, fusible, burning with a pleasant smell, insoluble in water, and partially soluble in alcohol and fixed oils. Neumann found that, during digestion with alcohol, a portion separates, insoluble in alcohol, though in appearance resinous, amounting to one tenth of the mastich, and analogous to caoutchouc.

Its flavour is communicated to water. It is therefore a resin, combined with a little essential oil. It is principally used by the Turkish women as a masticatory, to preserve the teeth, and to give a pleasant smell to the breath.

PLUMBUM. *Ed. Lond.*

Lead.

THE general properties of lead have been already enumerated.

Lead is found,

I. Oxidized:
  1. Lead ochre of different colours.

II. Oxidized, and combined with acids.
  2. Carbonated lead. White lead spar.
  3. Murio-carbonated.
  4. Phosphated lead. Green lead ore.
  5. Arseniated lead.
  6. Arsenio-phosphated lead.
  7. Molybdated lead.
  8. Sulphated lead.

III. Sulphuretted:
  9. Sulphuretted lead. Galena.
  10. Sulphuretted oxide of lead.

Lead is obtained by various processes from these ores. In its metallic form it is scarcely an officinal article, as its different oxides are purchased from the manufacturers, and never prepared by the apothecary.

Dr. Thomson admits of four states of oxidization of lead.

				Lead.	Oxygen.
Protoxide.	Yellow.	-	-	91.5	8.5
Deutoxide.	Yellow.	-	-	90.5	9.5
Tritoxide.	Red.	-	-	88.	12.
Peroxide.	Brown.	-	-	80.	20.

Medical use.—Its effects on the body are emaciation, violent colics, paralysis, tremors, and contractions of the limbs; and as they generally came on gradually, the cause is sometimes overlooked till it be too late. Poisoning from lead is never intentional, but only accidental, either from liquors becoming impregnated with lead, by being improperly kept in vessels lined or glazed with lead, or to which lead has been criminally added, to correct its acidity; or among manufacturers who work much with lead, as painters and plumbers, and who are not sufficiently attentive to avoid swallowing it.

The presence of lead in any suspected liquor is detected by the hydro-sulphuret of potass, which forms with it a brown precipitate, not soluble in diluted muriatic acid; and still more certainly, by evaporating a portion of the liquor to dryness, and exposing the extract to a heat sufficient to reduce the lead.

OXIDUM PLUMBI ALBUM. Syn. *Cerussa. Carbonas Plumbi. Ed.*

PLUMBI CARBONAS. Syn. *Subcarbonas Plumbi*

CERUSSA. Syn. *Subacetas Plumbi. Dub.*

White oxide of lead. Ceruse. White lead. Subacetate of lead. Carbonate of lead.

This substance is prepared by exposing lead to the vapour of vinegar. To accelerate the oxidizement, the lead is cast in thin plates, which are rolled up spirally. A number of these are placed perpendicularly on a support, over a flat vessel containing vinegar, which is converted into vapour by a gentle heat, such as that of dung. The plates become slowly covered with a white crust, which is in due time removed; and the remains of the plates are again exposed to the vapour of vinegar, until they be entirely corroded. Van Mons says, that if lead ashes be dissolved in nitric acid, and precipitated by chalk in impalpable powder, the precipitate, when washed and dried, will be ceruse in its purest state.

White oxide of lead has a scaly or foliated texture, is brittle, friable, heavy, of a snowy whiteness, and a sweet taste. It is often adulterated with earthy substances, which may be discovered by mixing it with oil, and reducing the lead in a crucible. Although very friable, the coarser particles cannot be separated by means of a sieve, because its interstices soon get filled up. It can only be obtained in the state of a fine powder by rubbing a loaf of ceruse on a sieve placed over a sheet of paper. It consists of 84 yellow oxide of lead, and 14 carbonic acid.

In pharmacy the white oxide of lead is used in the composition of ointments and plasters.

Oxidum Plumbi Rubrum. Syn. *Minium.* *Ed.*
Red oxide of lead. Red lead.

The preparation of red lead is so troublesome and tedious, that the preparation of it forms a distinct branch of business. The manufacturers melt large quantities of lead at once, upon the bottom of a reverberatory furnace built for this purpose, and so contrived, that the flame acts upon a large surface of the metal, which is continually changed by means of iron rakes drawn backwards and forwards, till the fluidity of the lead is destroyed; after which, the oxide is only now and then turned.

The red oxide of lead is obtained in the form of a very heavy powder, consisting of minute shining scales, of a bright scarlet, verging towards yellow, especially if triturated. It is sometimes adulterated with red oxide of iron, red bole, or powdered brick. These frauds are detected by the inferiority of colour, by mixing it with oil, and subjecting it to the test of reduction; and by its forming a black precipitate with tincture of galls, when dissolved in nitrous acid.

The red oxide of lead contains 88 lead and 12 oxygen. When red lead is treated with diluted nitrous acid, 76 parts are dissolved, and 24 of a flea-brown powder remain behind. This powder is the peroxide of lead, and contains 20 per cent. oxygen. It is only soluble in the hyper-oxymuriatic acid. The 76 parts dissolved are yellow oxide.

OXIDUM PLUMBI SEMIVITREUM. *Ed. Lond.* LITHARGYRUM. *Dub.*

Semi-vitrified oxide of lead. Litharge.

IF oxidized lead be melted with a quick fire, it gets the appearance of oil, and on cooling concretes into litharge. Greatest part of the litharge met with in the shops is produced in the purification of silver from lead, and the refining of gold and silver by means of this metal. According to the degree of fire and other circumstances, it has a pale or deep colour; the first has been commonly called Litharge of silver, the other, Litharge of gold. Lithrage is a sub-carbonate of lead. It contains 96 yellow oxide, and 4 carbonic acid. It also frequently contains a little oxide of antimony.

The oxides of lead dissolve in heat by expressed oils; these mixtures are the basis of several officinal plasters and ointments.

Lead and its oxides, when undissolved, have no considerable effects as medicines. Dissolved in oils, they are supposed to be (when externally applied) anti-inflammatory and desiccative. Combined with vegetable acids, they are remarkably so; and taken internally, prove powerful, though dangerous styptics.

POLYGALA SENEGA. *Ed. Lond. Dub.*

Willd. g. 1313. *sp.* 67. *Diadelphia Octandria.*—Nat. ord. *Lomentaceæ.*

Seneka, or Rattlesnake Root.

Off.—Radix Polygalæ Senegæ. *Ed.*
Senegæ radix. *Lond.* Senakæ radix. *Dub.*
The root.

SENEKA is a perennial plant which grows wild in North America, particularly Virginia and Pennsylvania. This root is usually about the thickness of the little finger, variously bent and contorted, and appears as if composed of joints, whence it is supposed to resemble the tail of the animal whose name it bears; a kind of membranous margin runs on each side the whole length of the root.

The bark is the active part of the root. Its taste is at first acrid, afterwards very hot and pungent. It has no smell.

Its acrimony resides in a resin; for it is entirely extracted by alcohol; is precipitated by water; does not rise in distillation; and is not destroyed by keeping.

Medical use.—It is an active stimulus, and increases the force of the circulation, especially of the pulmonary vessels. It has, therefore, been found useful in typhoid inflammations of the lungs; but it is apt to disorder the stomach, and to induce diarrhœa. Dr. Brandreth of Liverpool has derived great benefit in some cases of lethargy from an extract of seneka combined with carbonate of ammonia.

Some have likewise employed this root in hydropic cases, and not without success. There are examples of its occasioning a plentiful evacuation by stool, urine, and perspiration; and by this means removing the disease, after the common diuretics and hydragogues had failed.

The Senegaro Indians are said to prevent the fatal effects of the bite of the rattlesnake, by giving it internally, and by applying it externally to the wound.

The usual dose of the powder is 30 grains or more.

Externally, it has been advantageously used as a stimulating gargle in croup.

POLYGONUM BISTORTA. *Ed. Lond. Dub.*

Willd. g. 785. *sp.* 3. *Smith, g.* 196. *sp.* 6. *Octandria Trigynia.*—Nat. ord. *Oleraceæ.*

Great bistort, or snakeweed.

Off.—Radix Polygoni Bistortæ. *Ed.* Bistortæ radix. *Lond. Dub.*

The root.

Bistort is perennial, and grows wild in moist meadows in several parts of Britain. It flowers in June. The root is about the thickness of the little finger, of a blackish brown colour on the outside, and reddish within; it is writhed or bent vermicularly (whence the name of the plant), with a joint at each bending, and full of bushy fibres; the root of the species here mentioned has, for the most part, only one or two bendings, others have three or more. All the parts of bistort have a rough austere taste, particularly the root, which is one of the strongest of the vegetable astringents.

Medical use.—It is employed in hæmorrhagies and other fluxes, both internally and externally, where astringency is the only indication. To the sudorific, antipestilential, and antiseptic virtues attributed to it, it has no other claim than what it derives from its astringency.

PODYPODIUM FILIX MAS. *Ed. Dub.*

Murray, g. 1179. *sp.* 50.

ASPIDIUM FILIX MAS. *Lond.* *Smith, g.* 429. *sp.* 4.
Male fern. Male shield fern.

Off.—Radix Polypodii filicis maris. *Ed.*
Filicis maris radix. *Dub.*
Filicis radix. *Lond.*

THIS fern is perennial, flowers in June and July, and is found in great abundance in our woods. The root consists of many egg-shaped knots, closely compressed together, forming a crooked mass of a blackish colour, and covered with brown scales.

When chewed, its taste is somewhat mucilaginous and sweet, and afterwards slightly astringent and bitter. Its smell is also weak.

Medical use.—This root was used as an anthelmintic in the days of Dioscorides. It gradually became neglected; but its use was again revived at different times by Madam Nuffer, Herrenschwand, and others, who frequently succeeded in killing and expelling the tænia, both lata and cucurbitina, by the exhibition of secret remedies, of which the fern-powder was, or rather was supposed to be, the principal ingredient; for there is much reason to believe, that the active purgatives with which it was always combined, were really the remedies which effected the cure.

The same, or nearly a similar secret, has been bought by different potentates, and published for the benefit of those suffering under this obstinate disease.

The internal solid part of the root only is to be powdered, and the powder should have a reddish colour; and as the dose and exhibition of the remedy must be regulated according to the age, sex, and constitution of the patient, it must be given always under the direction of an experienced practitioner.

PRUNUS DOMESTICA. *Ed. Lond. Dub.*
Willd. g. 982. *sp.* 29. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ.*
Plum-tree.

Off.—Fructus Pruni Domesticæ. *Ed.*
Pruna; *Drupa siccata Pruni Domesticæ.* *Dub.*
Fructus Pruni Gallicæ. *Lond.*
The dried fruit, called French prunes.

THIS tree is found wild in hedges in England, but has probably originated from the stones of the cultivated kinds being dropt there by accident. It flowers in April. Great quantities of the dried fruit are imported from the continent, of which the French prunes are reckoned the best.

Medical use.—They contain much mucilaginous and saccharine matter, and their medical effects are, to abate heat, and gently loosen the belly, which they perform by lubricating the passages, and softening the excrement. They are of considerable service in costiveness, accompanied with heat or irritation, which the more stimulating cathartics would tend to aggravate: where prunes are not of themselves sufficient, their action may be promoted by joining with them a little rhubarb, or the like, to which may be added some carminative ingredient, to prevent their occasioning flatulency.

PTEROCARPUS.

Willd. g. 1318. *Diadelphia Decandria.*—Nat ord. *Papilionaceæ.*

Sp. 6. Pterocarpus Santalinus. *Ed. Lond. Dub.*

Off.—Lignum Pterocarpi Santalini. *Ed.*
Pterocarpi Lignum. *Lond.*
Santali rubri Lignum. *Dub.*
Red Saunders-wood.

This tree grows in the East Indies, and acquires a very large size. The wood is brought in large billets, of a compact texture, a dull red, almost blackish colour on the outside, and a deep brighter red within. It has no manifest smell, and little or no taste. It communicates a deep red to alcohol, but gives no tinge to aqueous liquors: a small quantity of the resin, extracted by means of spirit, tinges a large quantity of fresh spirit, of an elegant blood red. Neumann got from 960 grains, 210 alcoholic, and afterwards 20 of watery extract; and inversely, 126 tough watery extract, and 120 alcoholic; according to the same chemist, it gives out its colouring matter to volatite oil of lavender, but not to volatile oil of turpentine. Is this difference to be ascribed to the camphor contained in the former?

Sp. Pterocarpus Draco. *Ed.*
Dragon's blood.

Off.—Resina. The resin.

This is also a very large tree. It is a native of South America, and the resin which exudes from incisions made in its bark used to be frequently sent from Carthagena to Spain. It is, however, doubtful if the dragon's blood of the shops be produced from this tree, as many others furnish a similar resin, as the Dracæno draco, Dalbergia monetaria, and especially the Calamus draco, which probably furnishes all that is brought from the East Indies.

The best dragon's blood is not in cakes, but is brought in small masses, of the size of a nutmeg, wrapt up in the dried leaves of some kind of reed, breaks smooth, free from any visible impurities, of a dark red colour, which changes, upon being powdered, into an elegant bright crimson. This drug, in substance, has no sensible smell or taste; when dissolved, it discovers some degree of warmth and pungency. It is fusible and inflammable, and totally soluble in alcohol, tinging a large quantity of the menstruum of a deep red colour. It is likewise soluble in expressed oils, and gives them a red hue, less beautiful than that communicated by Anchusa. It is not acted upon by water, but precipitated by it from its alcoholic solution. I find that it is soluble in nitrous acid and alkalies, and that it neither precipitates gelatin, nor affects the colour of the salts of iron. It therefore appears to be a pure resin, without any astringency. I have been more particular in proving that this resin is not astringent, because Mr. Proust's account of it has been generally adopted. But the substance examined by Mr. Proust could not be the resin known in this country by the name of Dragon's blood, as it was as soluble in water as in alcohol. Dr. Fothergill, who first described kino, received it as the finest dragon's blood. Mr. Proust must have been misled by some similar misinformation, as the characters of his *sang dracon* correspond with those of kino.

PUNICA GRANATUM. *Ed. Lond. Dub.*

Willd. g. 980. *sp.* 1. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ.*

Pomegranate tree.

Off.—Punicæ Granati Fructus Cortex. *Ed.* Granati Cortex. *Lond.* Punicæ Granati pericarpii Cortex. *Dub.*
Punicæ Granati Flos plenus, vulgo Baulaustium. *Ed.* Flores Granati. *Dub.*
Pomegranate bark. The double flowers, called Balaustine.

The pomegranate is a low tree, or rather shrub, growing wild in Italy and other countries in the south of Europe. It is sometimes met with in our gardens; but the fruit, for which it is chiefly valued, rarely comes to perfection. This fruit has the general qualities of the other sweet summer fruits, allaying heat, quenching thirst, and gently loosening the belly. The rind is a strong astringent, striking a permanent blue with sulphate of iron, and as such is occasionally made use of. The flowers are of an elegant red colour, in appearance resembling a dried red rose.

Their taste is bitterish and astringent. They are recommended in diarrhœas, dysenteries, and other cases where astringent medicines are proper.

PYRUS CYDONIA. *Lond.*

Willd. g. 992. *sp.* 17. *Icosandria Pentagynia*—Nat. ord. *Pomaceæ.*

The quince.

Off.—Cydoniæ semina. *Lond.*
Quince seeds.

The quince is originally a native of Crete, but ripens its fruit perfectly in England.

Quinces have a very austere acid taste: taken in small quantity, they are supposed to restrain vomiting and alvine fluxes; and more liberally, to loosen the belly. The seeds abound with a mucilaginous substance, of no particular taste, which they readily impart to watery liquors; an ounce will render three pints of water thick and ropy, like the white of an egg. They will not, however, supply the place of gum-arabic, because their mucilage spoils very quickly, and is precipated by acids.

QUASSIA.

Willd. g. 849. *Decandria Monogynia.*—Nat. ord. *Gruinales.*

Sp. 2. Quassia Simaruba. *Ed. Lond. Dub.*
Mountain or bitter damson.

Off.—Cortex Quassiæ Simarubæ. *Ed.*
Simaroubæ Cortex. *Lond. Dub.*
Simaroubæ Lignum. *Dub.*
The bark and wood.

This tree grows in Guiana and in Jamaica. The simarouba of the shops is the bark of the root. It is brought to us in pieces some feet long, and some inches broad, folded lengthwise. It is light, fibrous, very tough; of a pale yellow on the inside; darker coloured, rough, scaly, and warted on the outside; has little smell, and a bitter, not disagreeable taste. It gives out its bitterness both to alcohol and water.

Medical use.—It has been much celebrated in obstinate diarrhœa, dysentery, anorexia, indigestion, lienteria, and intermittent fevers.

It is given in powder, in doses of half a drachm, or a whole drachm; but it is too bulky, and very difficultly pulverizable. It is best exhibited in decoction. Two drachms of the bark may be boiled in two pounds of water to one, and the decoction drunk in cupfuls in the course of the day.

Sp. 3. QUASSIA EXCELSA. *Ed. Lond. Dub.*
Quassia tree.

Off.—Lignum Quassiæ excelsæ. *Ed.*
Quassiæ Lignum. *Lond. Dub.*
The wood.

THE quassia of the shops is the wood of the root of this tree, which grows in Jamaica, and in the Caribæan islands, and not, as formerly supposed, of the Quassia amara, which is a very rare tree, surpassing all others in bitterness.

This root is about the thickness of a man's arm; its wood is whitish, becoming yellowish by exposure to the air. It has a thin, grey, fissured, brittle bark, which is deemed, in Surinam, more powerful than the wood. Quassia has no sensible odour, but is one of the most intense, durable, pure bitters known. Its infusion, decoction, and tincture are almost equally bitter, are yellowish, and are not blackened by chalybeates. The properties of the extract of quassia have been detailed by Dr. Thomson, under the title of the bitter principle.

Medical use.—It is a very pure and simple bitter, and may be given in all cases where bitters are proper. It has been exhibitted in intermittent and bilious fevers, in stomachic complaints, in lienteria, in cachexy, dropsies, leucorrhœa, and gout. It is much used in this country to give the bitterness to malt liquors, though it subjects those brewers who employ it to a very heavy penalty.

It can scarcely be reduced to a sufficiently fine powder to be given in substance, and is, therefore, generally given in the form of infusion, decoction, or extract.

QUERCUS.

Willd. g. 1692. *Smith, g.* 404. *Monoecia Polyandria.*—Nat. ord. *Amentaceæ.*

Sp. 65. *Willd.* QUERCUS PEDUNCULATA. *Lond.*
Sp. 1. *Smith.* QUERCUS ROBUR. *Ed. Dub.*
Common British oak.

Off.—Cortex Quercus Roboris. *Ed.*
Quercus cortex. *Lond. Dub.*
Oak-bark.

THE oak grows wild in Britain, and flowers in April. The superior excellence of its wood for ship-building has rendered its cultivation an object of national concern. Its saw-dust is an useful dye-stuff, and its bark is the principal article used in tanning M. Vauquelin has discovered a remarkable chemical difference between the bark and nut-galls, the latter precipitating tartrate of antimony and infusion of cinchona, which are not acted on by the former.

Med. use.—Oak-bark is a strong astringent, and is recommended in hæmorrhagies, alvine fluxes, and other preternatural or immoderate secretions. In these it is sometimes attended with good effects. But it is by no means capable of being employed as a substitute, in every instance, for Peruvian bark, as some have asserted; and, indeed, it is so difficultly reduced to a sufficiently fine powder, that it can scarcely be given internally, in substance.

Sp. QUERCUS CERRIS. *Ed.*
Oriental oak.

Off.—Cyniphis nidus, *Galla* dictus. *Ed.*
Gallæ, cynipidum nidi. *Dub.*
Galla, cynipis quercusfolii nidus. *Lond.*
The nest of the cynips quercusfolii, called nut-galls.

THIS species of oak is a native of the Levant, and of the warmer countries of Europe.

The cynips quercusfolii, a hymenopterous insect, deposites its eggs in the leaves and other tender parts of the tree. Around each puncture an excrescence is presently formed, within which the egg is hatched, and the insect passes through all the stages of its metamorphosis, until it becomes a perfect insect, when it eats its way out of its prison. These excrescences are called galls, or nut-galls. They are of different sizes, smooth or knotty on the surface, of a whitish, reddish, or blackish colour, and generally penetrated with a small hole. Internally they consist of a spongy, but hard, more or less brown substance, and they have a very rough astringent taste. Good galls are of a blackish grey, or yellow colour, heavy, and tuberculated on the surface. They are the most powerful astringents we possess; and since the discovery of the tanning principle by Mr. Seguin, have very much engaged the attention of chemists. Neumann got from 960 grains of coarsely powdered galls 840 watery extract, and afterwards only 4 alcoholic; and inversely, 760 alcoholic, and 80 watery. But the most minute analysis is that of Mr. Davy, who found that 500 grains of good Aleppo galls gave, by lixivating them until their soluble matters were taken up, and evaporating the solution slowly, 185 grains of solid matter, which, when examined by analysis, appeared to consist of,

Tannin, - - -	130
Mucilage, and matter rendered insoluble by evaporation, - -	12
Gallic acid, and a little extractive matter, -	31
Remainder, calcareous earth and saline matter	12

From my experiments, I am disposed to think that Mr. Davy has under-rated the tannin of nut-gulls; for by simple repeated infusions in hot water, the residuum of 500 grains in one experiment amounted only to 158, and in another only to 136 grains. The quantity of tannin, estimated in Mr. Davy's way, amounted, in the first to 220 grains, and in the second to 256. The great difference in these results from Mr. Davy's must be entirely ascribed to some differences in the galls themselves, or in the mode of operation. A saturated decoction of galls, on cooling, deposites a copious pale yellow precipitate, which seems to be purer tannin than what can be got by any other process; but it still requires and deserves a more minute examination. In my experiments, a very weak infusion of nut-galls was precipitated by sulphuric acid, lime-water, sub-carbonate of potass, acetate of lead, sulphate of copper, nitrate of silver, sulphate of iron, tartrate of antimony, nitrate of mercury, infusion of officinal cinchona, and solution of gelatine; it was not precipitated by nitrous acid, ammonia, sulphate of zinc, muriate of mercury, infusion of quassia, or infusion of saffron. To what principles these precipitates are owing remains still to be ascertained. Vauquelin justly observes, that the infusions of nut-galls and of cinchona agree in precipitating both gelatine and tartrate of antimony, but that they precipitate each other; another fact, equally curious, occurred in my experiments: a mutually saturated mixture of the infusions of nut-galls and cinchona still precipitates gelatine; but these infusions, separately saturated by gelatine, do not act on each other. Hence it appears, that the action of these infusions on each other depends on principles contained in each, compatible with the presence of tannin, but re-acting on each other, and that gelatine precipitates these principles along with the tannin. Mr. Davy has concluded that tannin and gelatine unite in fixed proportions, viz. 46 of tannin with 54 gelatine; were this correct, it would very much facilitate the analysis of astringents, but unfortunately my experiments do not confirm it. A twelve hours infusion of 500 grains of nut-galls in twelve ounces of water, precipitated successively with equal quantities of solution of gelatine, containing each twenty-four grains, gave precipitates weighing 98, 64, 48, and 36 grains: hence, if we suppose the whole gelatine used to be contained in each precipitate, these consisted of 24 grains of gelatine, and 74, 40, 24, and 12 grains of tannin; so that, from the weight of the precipitate alone, we cannot estimate the tannin. It has been generally asserted, that the precipitate of tannin and gelatine is insoluble in water, either cold or hot; but I find that in boiling water it not only becomes soft and viscid, but a certain portion is dissolved, which separates again when the solution cools. I may also remark, that if the precipitate be dried without any heat, it has a yellowish white appearance, opaque, and without lustre; but if exposed to a very moderate increase of temperature before it be dry, it seems to undergo a kind of fusion, and acquires transparency, a dark brown red colour, and a resinous lustre; with a higher temperature, even when almost dry, it will become so fluid as to pass through filtering paper. Mr. Davy discovered that it is soluble in excess of gelatine. It is also extremely soluble in ammonia, forming a red solution.

Medical use.—An infusion or decoction of galls may be used with advantage as an astringent gargle; and an ointment of one part of finely powdered galls to eight of any simple ointment is applied with success in hæmorrhoidal affections.

RHAMNUS CATHARTICUS. *Ed. Dub. Lond.*

Willd g. 405. *sp.* 1. *Smith*, *g.* 105. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Dumosæ.*

Purging buckthorn.

Off.—Succus baccarum Rhamni carthartici. *Ed.*
Baccæ Rhamni. *Lond.*
Baccæ Rhamni cathartici. *Dub.*
The berry. The juice of the berries.

THIS tree, or bush, is common in hedges: it flowers in May and June, and ripens its fruit in September or the beginning of October. In our markets, the fruit of some other trees, as the blackberry bearing alder and the dogberry tree, have of late been frequently mixed with, or substituted for, those of buckthorn. This abuse may be discovered by opening the berries; those of buckthorn have almost always four seeds, the berries of the alder two, and those of the dogberry only one. Buckthorn berries, bruised on white paper, stain it of a green colour, which the others do not. Those who sell the juice to the apothecaries, are said to mix it with a large proportion of water.

Medical use.—Buckthorn berries have a faint disagreeable smell, and a nauseous bitter taste. They have long been in considerable esteem as cathartics, and celebrated in dropsies, rheumatisms, and even in the gout; though in these cases they have no advantage over other purgatives, but are more offensive, and operate more severely, than many which the shops are furnished with. They generally occasion gripes, sickness, dry the mouth and throat, and leave a thirst of long duration. The dose is about twenty of the fresh berries in substance, and twice or thrice this number in decoction; an ounce of the expressed juice, or a drachm of the dried berries.

RHEUM.

Willd. g. 803. *Enneandria Monogynia.*—Nat. ord. *Oleraceæ.*

Sp. 3. RHEUM PALMATUM. *Ed. Lond. Dub.*
Palmated rhubarb.

Off.—Radix Rhei palmati. *Ed.*
Rhei radix. *Lond. Dub.*
The root.

Sp. 2. RHEUM UNDULATUM. *Dub.*

Off.—Radix Rhei undulati. *Dub.*
The root.

BOTH of these species grow spontaneously in China, and endure the colds of our climate.

But it is not ascertained that the Chinese or Russian rhubarb is the dried root of either the one or the other. Pallas thinks that it is obtained indiscriminately from the *rheum undulatum*, *palmatum*, and *compactum*, more especially from the first; while Mr. Sievers, an apothecary who was sent by Catherine II. on purpose to obtain the true rhubarb plant, and travelled for several years in the countries contiguous to that whence the rhubarb is brought, is of opinion, that the botanical characters of the plant, which furnishes it, are still unknown, excepting that it is said not to grow to a great size, and to have round leaves, which are toothed on the edges with almost spinous points.

All the rhubarb of commerce is brought from the Chinese town Sini, or Selim, by the Bucharians. It grows on the neighbouring chain of lofty mountains which stretches to the lake Koko-Nor, near the source of the river Chorico, between 35° and 40° north latitude. It is dug up by the poor peasants, cleaned from the earth, cut in pieces, strung with the bark on strings, and exposed to dry under cover in the shade for a whole year, when it is again cleaned and prepared for exportation.

There is a distinction made in commerce between the Russian and Chinese rhubarb, although they both come from the same country.

The Russian is dearer, and always good, as very great attention is paid both in purchasing and transporting it, by order of the government. In Kiachta, on the Russian frontier, it is received from the Bucharians by a Russian apothecary, who examines it. The bad is immediately burnt, and the good is freed from its bark, woody parts, and every impurity, in the most careful manner. It is then sent to Moscow and to Petersburgh, where it is again examined.

It is commonly in round pieces, of a reddish or whitish yellow colour, feels gritty between the teeth, and is often perforated with so large a hole, that many pieces have the appearance of a bark.

The Chinese or East-Indian rhubarb is brought by sea from Canton. It is heavier, harder, and more compact than the other; seldom perforated with holes, and either in long pieces, or with two flat sides, as if they had been compressed. Dr. Lewis thinks that this is less aromatic, but stronger, than the Turkey; and that it has required less care in drying from having been lifted when the root was less watery.

The general characters of good rhubarb are, its having a whitish or clear yellow colour, being dry, solid, and compact, moderately heavy, brittle; when recently broken, appearing marked with yellow or reddish veins, mixed with white; being easily pulverizable; forming a powder of a fine bright yellow, having the peculiar, nauseous, aromatic smell of rhubarb, and a sub-acrid, bitterish, somewhat astringent taste, and when chewed feeling gritty under the teeth, speedily colouring the saliva, and not appearing very mucilaginous. The size and form of the pieces are of little consequence; only we must break the large ones, to see that they are not decayed or rotten within; and we must also observe that they are not musty or worm-eaten. This is the more necessary, as damaged pieces are frequently so artfully dressed up, and coloured with powdered rhubarb, as to impose on the buyer.

The principal constituent of rhubarb is extractive matter, soluble both in alcohol and in water. By gentle decoction, it loses above one half its weight. Rhubarb also contains some volatile odorous matter, on which its peculiar nauseous smell, and its activity as a purge, depend; for when dissipated, either by age or any preparation to which the rhubarb has been subjected, the powers of the medicine are almost destroyed. It also contains about one sixth of its weight of oxalate of lime, and some tannin, which resides entirely in the dark coloured veins, for on wetting the surface with a weak chalybeate solution, these alone are blackened, while the white veins do not change their colour. Neumann got from 480 grains 180 of alcoholic, and afterwards 170 watery extract; and inversely, 350 watery, and only 5 of alcoholic extract.

Various species of rhubarb are cultivated in this country, especially the palmatum, and sometimes in very large quantities; so that there can be no doubt that the roots, the growth of this country, may be so prepared as to have the appearance, at least, of foreign rhubarb. The greatest difficulty seems to be the drying it properly. Its cultivation is easy. It is sown in spring, in a light soil, and transplanted next spring into a light soil, well trenched, and the plants set at a yard distance from each other each way. The third year some plants begin to flower, but the roots are not lifted till the autumn of the sixth year. They are first to be washed in a large quantity of water, and after the fibres and small roots are cut off, to be well brushed in fresh water, and cut into pieces of a proper size. The brown bark is then rasped off, and they are again thrown into fresh water for three or four hours, in which they give out a great quantity of gummy matter. They are then taken out, and laid upon twigs to drip till next morning, and it is chiefly in this time that they exude at every part a white transparent gummy matter, resembling jelly. They are lastly placed in a stove, heated to 120° or 140°, till they dry. Twenty-five pounds of the recent root gave only about eight pounds dry. It is not, however, yet fit for sale. All the wrinkles must be rasped and filed out, and the pieces thus dressed put in a barrel fixed on an axis, and rolled about in it for twenty minutes or half an hour, when they get covered by a fine powder, formed by their rubbing against each other. Prepared in this way, Baumé assures us that it not only has the appearance of foreign rhubarb, but like it could also be immediately powdered. The chief peculiarity in his process is the steeping the roots, after they are cleaned, in water, by which means they are deprived of a great quantity of gummy matter; and without this precaution, even when apparently perfectly dry, the roots cannot be reduced into powder, but become pasty under the pestle, until it be two years old, and even then the powder is apt to concrete into lumps, and to get a dark brown colour. Four ounces of French rhubarb yielded to Baumé 1644 grains of extract, and the same quantity of foreign rhubarb 1500. British rhubarb, as it is called, is cultivated in considerable quantities in the neighbourhood of Edinburgh, and sold at nearly the price of foreign rhubarb. It is easily reduced to a very fine powder, although it is merely washed and peeled before it be cut into proper pieces, and dried upon the top of a baker's oven. The leaf-stalks of rhubarb contain a pleasant acid juice, and are used for making tarts, which are very like those of quinces.

Med. use.—Rhubarb is a mild cathartic, which operates without violence or irritation, and may be given with safety even to pregnant women and to children. In some people, however, it occasions severe griping. Besides its purgative quality, it is celebrated as an astringent, by which it increases the tone of the stomach and intestines, and proves useful in diarrhœa and disorders proceeding from laxity.

Rhubarb is exhibited,

1. In substance, in the form of powder. It operates more powerfully as a purgative in this form than in any other. The dose for an adult is about a scruple or upwards. On account of its great bulk, it is sometimes unpleasant to take a sufficient dose; its laxative effects are therefore often increased by the addition of neutral salts, or other more active purgatives. In smaller doses it often proves an excellent stomachic.

2. In infusion. Rhubarb yields more of its purgative property to water than to alcohol. The infusion is, however, considerably weaker than the powder, and requires double the dose to produce the same effect. It is well adapted for children, but must be always fresh prepared.

3. In tincture. On account of the stimulating nature of the menstruum, this preparation frequently cannot be exhibited in doses large enough to operate as a purgative. Its principal use is as a tonic and stomachic.

The virtues of rhubarb are destroyed by roasting, boiling, and in forming the extract.

RHODODENDRON CHRYSANTHUM. *Ed.*

Willd. g. 867. *sp.* 7. *Decandria Monogynia.*—Nat. ord. *Bicornes.*

Yellow-flowered rhododendron.

Off.—Folia. The leaves.

THIS small shrub grows in the coldest situations, and highest parts of the snow-covered mountains in East Siberia, and especially in Dauria. The leaves are oblong, rigid, reflected at the edges, rough on the upper surface, smooth, and paler on the lower. When dried, they have no smell, but a rough, astringent, and bitterish taste. They also contain a stimulant narcotic principle; for they increase the heat of the body, excite thirst, and produce diaphoresis, or an increased discharge of the other secretions or excretions; and in a large dose, inebriation and delirium.

Medical use.—In decoction, it is used in Siberia in rheumatism and gout. About two drachms of the dried shrub are infused in an earthen pot, with about ten ounces of boiling water, keeping it near a boiling heat for a night, and the infusion taken in the morning. Besides its other effects, it is said to produce a sensation of prickling or creeping in the pained parts; but in a few hours the pain and disagreeable symptoms are relieved, and two or three doses generally complete the cure. Liquids are not allowed during its operation, as they are apt to induce vomiting.

RHUS TOXICODENDRON. *Ed. Lond.*

Willd. g. 566. *sp.* 17. *Pentandria Trigynia.*—Nat. ord. *Dumosæ.*

Poison oak.

Off.—Folia Rhi toxicodendri. *Ed.*
Toxicodendri folia. *Lond.*
The leaves.

This is a deciduous shrub of moderate growth, a native of North America. The leaves are alternate, and stand upon very long leaf-stalks. Each leaf consists of three leafits. It is said that its juice is so extremely acrid as to cause inflammation, and sometimes even sphacelation, in the parts touched with it.

Med. use.—It was first tried as a medicine by Dr. Alderson of Hull, in imitation of the experiments of M. Fresnoi with the Rhus radicans. He gave it in four cases of paralysis, in doses of half a grain, or a grain, three times a-day, and all his patients recovered, to a certain degree, the use of their limbs. The first symptom of amendment was always an unpleasant feeling of prickling or twitching in the paralytic limbs. We have given it in larger doses, without experiencing the same success. It was not, however, inactive. In one case the patient discontinued its use on account of the disagreeable prickling it occasioned; and in general it operated as a gentle laxative, notwithstanding the torpid state of the bowels of such patients.

RICINUS COMMUNIS. *Ed. Lond. Dub.*

Willd. g. 1720. *sp.* 2. *Monoecia Monadelphia*—Nat. ord. *Tricoccæ.*

Palma Christi.

Off.—Semina Ricini communis. *Ed.* Semina Ricini. *Lond.*
Oleum fixum Ricini communis. *Ed.* Oleum Ricini. *Lond. Dub.*
The seeds, and the fixed oil obtained from them. Castor oil.

This plant grows in both Indies, Africa, and the south of Europe. It is of speedy growth, and in one year arrives at its full height, which seldom exceeds twenty feet. The capsules are prickly and triangular, and contain, under a thin, dry, grey, and black-marbled husk, a white oily kernel. The skin is extremely acrid; and one or two of the seeds swallowed entire operate as a drastic purgative or emetic.

The kernels yield almost a fourth part of their weight of a bland fixed oil, commonly called Castor oil. It is obtained from them either by expression, or by decoction with water. The former method is practised in Europe, the latter in Jamaica. To increase the product, it is common to parch the seeds over the fire, before the oil is extracted from them; but the oil thus obtained is inferior to that prepared by cold expression or simple decoction, and is apt to become rancid.

Genuine castor oil is thick and viscid, of a whitish colour, insipid or sweetish to the taste, and without smell.

Medical use.—As a medicine, it is a gentle and useful purgative: it in general produces its effects without griping, and may be given with safety where acrid purgatives are improper, as in colic, calculus, gonorrhœa, &c.: some likewise use it as a purgative in worm cases. Half an ounce, or an ounce, commonly answers with an adult, and a drachm or two with an infant.

The aversion to swallowing oil is generally considerable. Different modes of overcoming this have been proposed. Some prefer taking it swimming on a glass of water, or peppermint water, others in the form of an emulsion, with mucilage, or with the addition of a little rum.

ROSA.

Willd. g 997. *Smith. g.* 232. *Icosandria Polygynia.*—Nat. ord. *Senticosæ.*

Sp. 16. *Willd.* Rosa Gallica. *Ed. Lond. Dub.*
Red rose.

Off.—Petala Rosæ Gallicæ. *Ed. Lond.*
Petala Rosæ rubræ. *Dub.*
The petals.

This has not the fragrance of the succeeding species; but the beautiful colour of its petals, and their pleasant astringency, have rendered them officinal. It must, however, be remarked, that their odour is increased by drying, while that of the damask rose is almost destroyed.

Sp. 15. *Willd.* Rosa Centifolia. *Ed. Lond. Dub.*
Damask rose.

Off.—Petala Rosæ centifoliæ. *Ed. Lond.*
Petala Rosæ Damascenæ. *Dub.*
The petals.

The native country of this shrub is unknown, but the delightful fragrance of its flowers has rendered it the favourite ornament of every garden. In the former editions of Linnæus, the damask rose was considered as a variety only of the Rosa centifolia; but Aiton, Du Roy, and Willdenow have arranged it as distinct species. This used to be the officinal rose for the distillation of rose water, but now the more common variety is ordered, as it is highly probable that the petals of all the varieties of the Rosa centifolia, or Dutch hundred-leaved rose, are employed indiscriminately for this purpose.

Sp. 31. *Willd.; sp.* 6. *Smith.* ROSA CANINA. *Ed. Lond.*
Common dog-rose, wild briar, or hep-tree.

Off.—Fructus recens, Rosæ caninæ. *Ed.*
Pulpa Rosæ caninæ; baccarum pulpa expressa. *Lond.*
The fruit called Heps.

THIS shrub is found in hedges throughout Britain, and flowers in June. The pulp of the fruit, besides saccharine matter, contains citric acid, which gives it an acid taste. The seeds, and stiff hair with which they are surrounded, must be carefully removed from the pulp before it can be used.

ROSMARINUS OFFICINALIS. *Ed. Lond. Dub.*

Willd. g. 62. *sp.* 1. *Diandria Monogynia.*—Nat. ord. *Verticillatæ.*
Rosemary.

Off.—Summitas florens Rorismarini officinalis. *Ed.*
Cacumina Rorismarini. *Lond.*
Herba Rorismarini. *Dub.*
The herb and flowers.

ROSEMARY is a perennial shrub, which grows wild in the south of Europe, and is cultivated in our gardens. It has a fragrant smell, and a warm pungent bitterish taste, approaching to lavender: the leaves and tender tops are strongest; next to these the cup of the flower; the flowers themselves are considerably the weakest, but most pleasant.

Medical use.—Its virtues depend entirely on its essential oil, which seems to be combined with camphor, not only from its peculiar taste, but from its possessing chemical properties, which depend on the presence of camphor; and from its depositing crystals of camphor when long kept.

RUBIA TINCTORUM. *Ed. Lond. Dub.*

Willd. g. 187. *sp.* 1. *Tetrandria Monogynia.*—Nat. ord. *Stellatæ.*
Madder.

Off.—Radix Rubiæ tinctorum. *Ed.*
Radix Rubiæ. *Lond. Dub.*
The root.

MADDER is perennial, and is cultivated in large quantities in England, from whence the dyers are principally supplied with it. It has been said to grow wild in the south of England, but the Rubia peregrina was mistaken for it.

The roots consist of articulated fibres, about the thickness of a quill, which are red throughout, have a weak smell, and a bitterish astringent taste. For the use of the dyers, they are first peeled and dried, then bruised and packed in barrels. Madder possesses the remarkable property of tinging the urine, milk, and bones of animals which are fed with it, of a red colour.

Med. use.—It is said to be useful in the atrophy of children, and some believe in its reputed powers as an emmenagogue.

It is given in substance in doses of half a drachm, several times a-day, or in decoction.

RUMEX.

Willd. g. 699. *Smith, g.* 184. *Hexandria trigynia.*—Nat. ord. *Oleraceæ.*

Sp. 18. *Willd.; sp.* 8. *Smith.* RUMEX AQUATICUS. *Dub.* Great water-dock.

Off.—Radix. The root.

THIS is a perennial weed, growing in ditches and by the sides of rivers. It grows to the height of five feet, and flowers in July and August. The root is large, and is manifestly astringent. It evidently is the *Herba Britannica* of the ancients, so much celebrated for the cure of scurvy and cutaneous diseases. Even syphilis has been said to yield to an infusion of water-dock in wine and vinegar.

Sp. 31. *Willd.; sp.* 10. *Smith.* RUMEX ACETOSA. *Ed. Lond.* Common sorrel.

Off.—Folium Rumicis acetosæ. *Ed.*
Acetosæ folia. *Lond.*
The leaves.

SORREL is a perennial plant, which grows wild in fields and meadows throughout Britain, and flowers in June. The leaves have an astringent acid taste, without any smell or particular flavour: their medical effects are, to cool, quench thirst, and promote the urinary discharge: a decoction of them in whey affords an useful and agreeable drink in febrile or inflammatory disorders. All these effects are to be ascribed entirely to the super-oxalate of potass which they contain.

RUTA GRAVEOLENS. *Ed. Lond. Dub.*

Willd. g. 927. *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Multisiliquæ.*

Rue.

Off.—Herba Rutæ graveolentis. *Ed.*
Folia Rutæ. *Lond. Dub.*
The herb.

This is a small shrubby plant, a native of the south of Europe, and cultivated in our gardens.

Rue has a strong ungrateful smell, and a bitterish penetrating taste: the leaves, when in full vigour, are extremely acrid, insomuch as to inflame and blister the skin, if much handled. Neumann got from 960 grains of the dried leaves 330 alcoholic extract, and afterwards 290 watery; and inversely, 540 watery and 40 alcoholic. Both primary extracts are bitter and acrid. Rue also contains a volatile oil, which congeals readily, and is obtained in the greatest quantity by distilling the plant with the seeds half ripe.

Medical use.—With regard to its medical virtues, like other remedies of which the active constituent is an essential oil, it is heating and stimulating, and hence it is sometimes serviceable in spasmodic affections, and cases of obstructed secretions.

SACCHARUM OFFICINARUM. *Ed. Lond. Dub.*

Willd. g. 122. *sp.* 4. *Triandria Digynia.*—Nat. ord. *Gramina.*

Sugar-cane.

Off.—*a.* Saccharum. *Lond.* Saccharum non purificatum. *Ed.*
Saccharum rubrum. *Dub.*
b. Saccharum purificatum. *Lond. Dub.* Saccharum purissimum. *Ed.*
c. Sacchari rubri syrupus. *Dub.*
Raw or brown sugar. Double refined sugar. Molasses.

The sugar-cane grows wild in both Indies, and forms the chief object of cultivation in the West Indies.

Sugar, of which we have already noticed the general properties, is principally obtained from this plant, by boiling down its expressed juice, with the addition of a certain proportion of lime or potass, until the greater part is disposed to concrete into brownish or yellowish crystalline grains. The lime or potass is added to saturate some malic acid, whose presence impedes the crystallization. The *molasses*, or that portion of the inspissated juice which does not crystallize, is separated from the *raw sugar*, which is sent to Europe to be refined. This is performed by dissolving it in water, boiling the solution with lime-water, clarifying it with blood or white of eggs, and straining it through woollen bags. The solution, after due evaporation, is permitted to cool to a certain degree, and then poured into conical forms of unglazed earthen ware, where it concretes into a mass of irregular crystals. The syrup which has not crystallized runs off through a hole in the apex of the cone. The upper or broad end of the cone is then covered with moist clay, the water of which gradually penetrates into the sugar, and displaces a quantity of syrup, which would otherwise be retained in it, and discolour it. It is then carefully dried, and gets the name of *loaf* or *lump sugar*. When the solution and other steps of the process are repeated, the sugar is said to be *double refined.* Sugar is sometimes made to assume a more regular form of crystallization, by carrying the evaporation only a certain length, and then permitting the syrup to cool slowly. In this form it is called *Brown* or *White sugar candy*, according to the degree of its purity.

Raw sugar varies very much in quality. It should be dry, crystallized in large sparkling hard grains, of a whitish or clear yellow colour, without smell, and of a sweet taste, without any peculiar flavour.

Refined sugar should have a brilliant white colour, and a close compact texture. It should be very hard, but brittle, and break with sharp, semi-transparent, splintery fragments.

Medical use.—Sugar, from being a luxury, has now become one of the necessaries of life. In Europe sugar is almost solely used as a condiment. But it is also a very wholesome and powerful article of nourishment; for during crop time, the negroes in the West Indies, notwithstanding their increased labours, always grow fat. It is in this way also that its internal employment is useful in some diseases, as in sea scurvy; for sugar produces no particular effect as a medicine, except that the coarser and impure kinds are slightly purgative. Applied externally it acts as an escharotic in spongy and unhealthy granulations; and to abraded or inflamed surfaces it proves gently stimulant. In pharmacy it is principally employed to cover bad tastes, to give form to, and to preserve more active substances. In using it for the last purpose, we must always remember, that if the proportion of sugar employed be too small, it will promote, instead of retarding the fermentation of the articles it is intended to preserve.

Molasses or treacle is a very impure syrup. It is thick, viscid, of a dark brown, almost black colour, and has a peculiar smell, and a sweet, somewhat empyreumatic taste. Treacle is applied to many domestic and economical purposes; and in hospital practice may supersede the use of sugar in many instances.

SAGAPENUM. *Gummi-resina. Ed. Lond. Dub.*
Sagapenum. A gum-resin.

The plant which furnishes the substance is not ascertained, but is conjectured by Willdenow to be the Ferula Persica.

Sagapenum is a concrete juice, brought from Alexandria, either in distinct tears, or agglutinated in large masses. It is outwardly of a yellowish colour; internally somewhat paler, and clear like horn; it grows soft upon being handled, and sticks to the fingers; its taste is hot, nauseous, and bitterish, and its smell disagreeable and alliaceous.

Neumann got from 480 grains, 306 alcoholic and 108 watery extract; and inversely, 170 watery, and 241 alcoholic extract. The alcohol distilled from it was sensibly impregnated with its flavour, and along with the water a considerable portion of volatile oil arose. It is not fusible.

Medical use.—In medical virtues it holds a kind of middle place between assa fœtida and galbanum, and may be employed in the same manner, and under similar circumstances.

SALIX.
Willd. g. 1756. *Smith, g.* 409. *Diœcia Diandria.*—Nat. ord. *Amentaceæ.*

Sp. 10. *Willd.; sp.* 17. *Smith.* Salix Fragilis. *Dub.*
Crack willow.

Off.—Cortex. The bark.

Sp. 33. *Willd.; sp.* 45. *Smith.* Salix Alba. *Dub.*
Common white willow.

Sp. 101. *Willd.* Lin. Trans.; *sp.* *Smith.* Salix Caprea. *Lond.*

Off.—Cortex. The bark.

These willows grow wild in England. The bark possesses a considerable degree of bitterness and astringency. Different species of willow have at different times been recommended as substitutes for the Peruvian bark: they are certainly powerful astringents, but, in point of efficacy in the cure of disease, they are in no degree to be compared with the Peruvian bark, from which they differ chemically in containing no cinchonin.

SALVIA OFFICINALIS. *Ed. Dub.*
Willd. g. 63. *sp.* 7. *Diandria Monogynia.*—Nat. ord. *Verticillatæ.*
Sage.
Off.—Folium Salviæ officinalis. *Ed.*
Salvia. *Dub.*
The leaves.

Sage is a perennial plant, a native of the south of Europe, and cultivated in our gardens. There are several varieties of it, differing in size, or in the colour of the flower, but their properties are the same. They have a peculiar aromatic smell, and a warm aromatic taste, with some degree of bitterness and astringency.

Medical use.—In its effects, sage agrees with other aromatics. It is stimulant, carminative, and tonic. In cold phlegmatic habits it excites appetite, and proves serviceable in debility of the nervous system. The best preparation for these purposes is an infusion of the dried leaves, drunk as tea, or a tincture, or extract, made with rectified spirit, taken in proper doses; these contain the whole virtues of the sage; the distilled water and essential oil only its warmth and aromatic quality, without any of its roughness or bitterness. Aqueous infusions of the leaves, with the addition of a little lemon-juice, prove an useful diluting drink in febrile disorders, being sufficiently agreeable to the palate.

SAMBUCUS NIGRA. *Ed.*

Willd. g. 569. *sp.* 3. *Smith, g.* 157. *sp.* 2. *Pentandria Trigynia.*—Nat. ord. *Dumosæ.*

Common elder.

Off.—Flos Sambuci nigri. *Ed.* Sambuci flores. *Lond. Dub.*
Baccæ Sambuci nigri. *Ed.* Baccæ Sambuci. *Dub.*
Cortex Sambuci nigri. *Ed.* Cortex interior Sambuci. *Dub.*
The inner bark, flowers, and berries.

This tree is frequent in hedges; it flowers in June, and ripens its fruit in September. The berries contain malic acid, and have a sweetish, not unpleasant taste; nevertheless, eaten in substance, they offend the stomach. For the market, they are gathered indiscriminately from the Sambucus nigra and Ebulus, a very venial fraud, as their effects are exactly the same. They are, however, easily distinguished, by the latter, when bruised, staining the fingers of a red colour, and the former of the colour of a withered leaf.

Medical use.—An infusion of the inner green bark of the trunk in wine, or the expressed juice of the berries in the dose of half an ounce or an ounce, is said to purge moderately, and in small doses to prove an efficacious deobstruent, capable of promoting all the fluid secretions. The expressed juice, inspissated to the consistence of a rob, proves an useful aperient medicine, promotes the natural evacuations, and, if continued for a sufficient length of time, is of considerable service in various chronical disorders. The young leaf-buds are strongly purgative, and act with so much violence as to be deservedly accounted unsafe. The flowers are very different in quality: these have an agreeable aromatic flavour, which they yield in distillation to water, and impart, by infusion, to vinous and spiritous liquors.

SAPO.

a. Sapo. *Ed. Dub.* Sapo durus. *Lond.*
Sapo ex oleo olivarum et soda confectus. *Ed.*
Sapo durus Hispanicus. *Dub.*
Sapo ex olivæ oleo et soda confectus (Hispanicus). *Lond.*
b. Sapo Mollis. *Lond.*
Sapo ex oleo et potassa confectus. *Lond.*

The general chemical properties of soap have been already noticed. Soap is of two kinds, hard and soft; hard when it is made with soda, and soft when made with potass. The latter is a strong, but coarse soap, and in medicine is only used externally as a detergent and cataplasm. The officinal species of the former is composed of olive oil and soda. It is only prepared in the countries which produce the oil. For medicinal use we prefer the Spanish.

It should be white and hard, dissolve entirely in water and in alcohol, forming with the former a milky, and with the latter a transparent solution; and the solutions should froth freely on agitation. It should not be variegated in its colour, feel greasy or moist, or be covered with a saline efflorescence; and the solutions should not have a rancid smell or taste. Some of the foreign Dispensatories are so very particular about the nature of the soap used in medicine, as to direct it to be prepared by the apothecary, by simply triturating, without the assistance of heat, Provence oil, with half its weight of a solution of soda, of the specific gravity of 1.375, until they unite.

Soap is decomposed by all the acids, earths, and earthy and metalline salts. The acids combine with the alkali, and separate the oil. The earths form an insoluble earthy soap with the oil, and separate the alkali; while with the salts there is a mutual decomposition, their acid combines with the alkali, and earthy or metalline soaps are formed.

Medical use.—The detergent property of soap, or the power it possesses of rendering oily and resinous substances miscible with water, has given rise to very erroneous notions of its medical virtues. It was supposed to render such substances more readily soluble in the juices of the stomach, and in the fluids of the body, and to be well fitted for dissolving such oily or unctuous matters as it may meet with in the body, attenuating viscid juices, opening obstructions of the viscera, and deterging all the vessels it passes through. It has likewise been supposed a powerful menstruum for the urinary calculus; and a solution of soap in lime-water has been considered as one of the strongest solvents that can be taken with safety into the stomach; for the virtue of this composition has been thought considerably greater than the aggregate of the dissolving powers of the soap and lime-water when unmixed.

How erroneous these ideas are, appears evidently, when we recollect the very easy decomposition of soap, which renders it perfectly impossible that it should enter the circulating system, or indeed come into contact with the fluids even of the mouth, without being decomposed. As to the solution of soap in lime-water, we may observe, that it is only a clumsy way of exhibiting a solution of soda; for the soap is decomposed, an insoluble soap of lime is formed, and the soda remains in solution. The internal use of soap should therefore be confined, in our opinion, to the giving form to other substances which are not decomposed by it, and to the decomposing metallic poisons when they have been taken into the stomach. For this last purpose, a tea-cupful of a solution of soap in four times its weight of water, may be drunk every three or four minutes, until a sufficient quantity be taken.

Applied externally, soap is a very powerful detergent, and combines the stimulating properties of the alkali with the lubricity of the oil. In this way it often proves a powerful discutient, and a useful application to sprains and bruises.

SCILLA MARITIMA. *Ed. Lond. Dub.*

Willd. g. 640. *sp.* 1. *Hexandria Monogynia.*—Nat. ord. *Liliaceæ.*

Squill.

Off.—Radix Scillæ maritimæ. *Ed.*
Scillæ radix. *Lond. Dub.*
The root.

The squill is a perennial bulbous-rooted plant, which grows wild on the sandy shores of Spain, Portugal, north of Africa, and the Levant.

The root is about the size of the fist, pear-shaped, with the apex upwards, and consists of fleshy scales, attenuated at both edges, surrounded by other scales, which are arid, shining, and so thin, that the root, at first sight, seems to be tunicated. The recent root is full of a white viscid juice, has scarcely any smell, but a very bitter, nauseous, and extremely acrid taste. Rubbed on the skin, it inflames and blisters.

It is more commonly met with in the shops, in the form of the dried scales, which should be brittle, semipellucid, smooth, but marked with lines, and when chewed, should feel tenacious, and taste very bitter, without manifest acrimony.

The active constituent of the squill is the acrid principle; and, therefore, it becomes almost inert by too much drying, or by being kept too long in the form of powder. It also contains bitter extractive, much mucilage, albumen, and starch.

Medical use.—Given internally in large doses, it produces purging and vomiting, sometimes even strangury, bloody urine, inflammation and erosion of the stomach. In smaller doses, it proves a useful expectorant and diuretic, and it is said to lessen the frequency of the pulse.

Squill is sometimes given as a general stimulant in typhus, especially to cattle. But it is much more frequently exhibited as an expectorant, where the lungs are loaded with viscid matter, and as a diuretic in dropsical cases, for which purpose it is commonly conjoined with calomel.

The dose of squill is one or two grains three or four times a-day; and the most commodious form for its exhibition, unless when designed as an emetic, is that of a bolus or pill: in a liquid form it is to most people too offensive, though rendered less disagreeable both to the palate and stomach by the addition of aromatic distilled waters.

SCROPHULARIA NODOSA. *Dub.*

Willd. g. 1152. *sp.* 2. *Smith, g.* 285. *sp.* 1. *Didynamia Angiospermia.*—Nat. ord. *Personatæ.*

Knotty-rooted figwort.

Off.—Herba Scrophulariæ. The herb.

This is a perennial plant, growing in woods and under hedges. It flowers in July. The roots are grey and knotty, and have a nauseous smell, and a sweet but somewhat acrid taste, both of which they partly lose by drying.

SINAPIS.

Willd. g. 1246.; *Smith, g.* 312. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ.*

Sp. 4. *Willd.*; *sp.* 2. *Smith.* Sinapis Alba. *Ed. Dub.*
White mustard.

Off.—Semina Sinapis albæ. *Ed.* Semina Sinapi. *Dub.* The seeds.

Sp. 5. *Willd.*; *sp.* 3. *Smith.* Sinapis Nigra. *Lond.*
Common mustard.

Off.—Sinapis Semina. The seeds.

These plants are both annual, both grow wild in England, and possess similar virtues.

They flower in June, and produce small round compressed seeds, which have an acrid bitterish taste, and a pungent smell when reduced to powder. The common mustard has blackish seeds, and is more pungent than the white.

They impart their taste and smell in perfection to aqueous liquors, whilst rectified spirit extracts extremely little of either: the whole of the pungency arises with water in distillation. Committed to the press, they yield a considerable quantity of a bland insipid oil, perfectly void of acrimony: the cake left after the expression is more pungent than the mustard itself.

Medical use.—Mustard-seed is swallowed entire, to the quantity of a table-spoonful or more, to stimulate the stomach in some cases of dyspepsia, and to excite the peristaltic motion of the intestines, especially when they are torpid, as in paralysis. The powder made into a paste with water is commonly used as a condiment with animal food; infused in water, it proves emetic when taken in considerable doses, and in smaller ones, acts as a diuretic and aperient; but it is more frequently applied externally as a topical stimulus, made into a paste, or sinapism, with vinegar and bread-crumb.

SISYMBRIUM NASTURTIUM. *Ed.*

Willd. g. 1238. *sp.* 1. *Smith, g.* 306, *sp.* 1. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ.*

Common water-cress.

Off.—Herba. The recent herb.

This plant is perennial, and grows wild in clear springs and rivulets throughout Britain. Its leaves remain green all the year, but are in greatest perfection in the spring. They have a pungent smell (when rubbed betwixt the fingers), and an acrid taste, similar to that of scurvy-grass, but weaker. By drying or boiling, they lose their sensible qualities entirely.

Medical use.—It acts as a gentle stimulant and diuretic: for these purposes, the expressed juice, which contains the peculiar taste and pungency of the herb, may be taken in doses of an ounce or two, and continued for a considerable time.

SIUM NODIFLORUM. *Dub.*

Willd. g. 544. *sp.* 4. *Smith, g.* 139. *sp.* 3. *Pentandria Digynia.*—Nat. ord. *Umbellatæ.*

Procumbent water parsnip.

Off.—Herba Sii. *Dub.*
The herb.

This plant is perennial, and grows wild in rivers and ditches in England. It flowers in July and August, and was formerly alleged to be not only diuretic, but also emmenagogue and lithontriptic. It is now scarcely employed.

SMILAX SARSAPARILLA. *Ed. Dub. Lond.*
Willd. g. 1800. *sp.* 9. *Dioecia Hexandria.*—Nat. ord. *Sarmentaceæ.*
Sarsaparilla.

Off.—Radix Smilacis sarsaparillæ. *Ed.*
Sarsaparillæ radix. *Lond. Dub.*
The root.

This root is brought from the Spanish West Indies. It consists of a great number of long fibres, hanging from one head: the long roots, the only part made use of, are of a blackish colour on the outside, and white within, about the thickness of a goose-quill, or thicker, flexible, composed of a very small woody heart, surrounded with fibres running their whole length, which renders them extremely apt to split. They have a glutinous, bitterish, not ungrateful taste, and no smell. Inferior kinds of this root are also sold. They are in general thicker, of a paler colour on the outside, and less white within, with a much thicker woody heart. Neumann got from 960 grains, 360 watery, and 10 alcoholic extract, and inversely 240 alcoholic, and 120 watery.

Medical use.—It was first brought into Europe by the Spaniards, about the year 1563, with the character of being a specific for the cure of the lues venerea, a disease which made its appearance a little before that time, and likewise of several obstinate chronic disorders. It is, however, a very inert mucilaginous substance, and the diaphoresis, which it is sometimes supposed to produce, is entirely owing to the warm and diluent regimen employed at the same time.

SOLANUM DULCAMARA. *Lond. Dub.*
Willd. g. 383. *sp.* 15. *Smith, g.* 100. *sp.* 1. *Pentandria Monadelphia.*—Nat. ord. *Solanaceæ.*
Bitter-sweet. Woody nightshade.

Off.—Dulcamaræ caulis. *Lond.*
Dulcamaræ stipites autumno collectæ. *Dub.*
The twigs.

This climbing shrub grows wild in moist hedges, has woody brittle stalks, and flowers in June and July. The twigs should be gathered early in spring. The taste, as the name of the plant expresses, is both bitter and sweet; the bitterness being first perceived, and the sweetness afterwards; and when fresh they have a nauseous smell.

Medical use.—The dulcamara was formerly much esteemed as a powerful medicine. It is in general said to increase all the secretions and excretions, to excite the heart and arteries, and, in large doses, to produce nausea, vomiting, and convulsions; but its effects seem to differ according to the nature of the soil on which it grows, being most efficacious in warm climates, and on dry soils. It has been recommended in cutaneous and venereal affections, in rheumatic and cathartic swellings, in ill-conditioned ulcers, scrophula, indurations from milk, leucorrhœa, jaundice, and obstructed menstruation. It has principally been employed under the form of the watery infusion, of a scruple taken daily, and gradually increased to two ounces. Six ounces may be boiled in six pounds of water to four, and four or five ounces given for a dose in as much milk. In the form of extract, from 5 to 10 grains may be given for a dose.

SOLIDAGO VIRGA AUREA. *Dub.*

Willd. g. 1483. *sp.* 35. *Smith, g.* 368. *sp.* 1. *Syngenesia Superflua.*—Nat ord. *Compositæ radiatæ.*

Common golden-rod.

Off.—Virgæ aureæ flores. *Dub.*
Virgæ aureæ folia. *Dub.*
The flowers and leaves.

This plant is perennial, and is found wild on heaths and in woods, producing spikes of yellow flowers from July to September. The leaves have a moderately astringent bitter taste; and thence prove serviceable in debility and laxity of the viscera, and disorders proceeding from that cause.

SPARTIUM SCOPARIUM. *Ed. Dub. Lond.*

Murray, g. 858. *sp.* 13. *Smith, g.* 321. *sp.* 1. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ.*

Common broom.

Off.—Summitates Spartii scoparii. *Ed.* Spartii cacumina. *Lond.* Genistæ cacumina. *Dub.*
Genistæ semina. *Dub.*
The tops and seeds.

This is a very common shrub on dry pastures, flowering in June and July, The leaves have a very bitter taste, and when given in decoctions prove considerably diuretic. The seeds have similar properties.

SPIGELIA MARILANDICA. *Ed.*

Willd. g. 308. *sp.* 2. *Pentandria Monogynia.*—Nat. ord. *Stellatæ.*

Carolina pink.

Off.—Radix Spigeliæ Marilandicæ. *Ed.*
Spigeliæ radix. *Lond. Dub.*
The root.

This plant is perennial, and grows wild in the southern parts of North America. It is the *Unsteetla* of the Cherokees. The root is celebrated as anthelmintic, particularly for the expulsion of lumbrici from the alimentary canal, and it often affords relief where no worms are discharged. Some order it in doses of ten or fifteen grains, while others give it in drachm doses, alleging that the nervous affections, it sometimes produces, more readily happen from small doses, as the large ones often purge or puke: Some prefer the form of infusion. An emetic is generally premised; and its purgative effect is assisted by some suitable additions. Infused in wine, it has been found useful in intermittents. Dr. Barton recommends it in the insidious remitting fever of children, which often lays the foundation for hydrocephalus.

SPONGIA OFFICINALIS. *Ed. Lond.*

Cl. *Zoophyta.* Ord. *Spongia.*

Sponge.

Off.—Spongia officinalis. *Ed.* Spongia. *Lond. Dub.*

Sponge is principally found in the Mediterranean and Red seas. It was long supposed to be a vegetable production, but it is now universally allowed to belong to that remarkable class of animals called Zoophytes, which are negatively characterised by Cuiver, as having no vertebræ, no sanguiferous vessels, no spinal marrow, and no articulated limbs. The sponges belong to that division of the zoophytes, which are attached to a solid trunk, and are particularised by their base being spongy, friable, or fibrous.

Sponge is a soft, light, very porous and compressible substance, absorbing by capillary attraction a large proportion of any fluid in which it is immersed.

Medical use.—From these properties it is an useful substance in the practice of surgery. When applied to ulcers which are accompanied with a copious discharge, it absorbs the thinner and more acrid fluid, and leaves the ulcers covered with the thicker and blander matter. It is also useful in suppressing hæmorrhagies, when properly applied by compression, by favouring the coagulation of the blood at the mouths of the vessels. It also forms a convenient tent for dilating wounds and fistulous ulcers, especially when prepared by immersing it in melted wax, and keeping it compressed until it cools. On the melting of the wax by the heat of the part to which it is applied, it gradually expands, and affords an uniform and gently dilating pressure.

Burnt sponge is nothing else than charcoal mixed with a little muriate of soda and phosphate of lime.

STALAGMITIS CAMBOGIOIDES. *Ed. Lond. Dub.*

Willd. g. 1888. *sp.* 1. *Polygamia Monoecia.*—Nat. ord. *Tricoccæ.*

Off.—Gambogia; gummi-resina. *Ed. Dub.*
Gambogia; gummi-resina. *Lond.*
The gum-resin called Gamboge.

The tree which furnishes the gamboge is of middling size, and grows wild in the kingdom of Siam and in Ceylon. In Siam the gum-resin is obtained in drops by breaking the leaves and young shoots; hence probably its name Gummi-guttæ; but in Ceylon it is extracted from the wood of the tree in the form of a juice, which soon becomes solid. Gamboge, or at least a very similar substance, is also got in the same way from different species of Garcinia, especially the Gambogia, (the Gambogia Gutta of Lin.) *Willd. g.* 938. *sp.* 3. *Dodecandria Monogynia*, and from different species of Hypericum, especially the Bacciferum. It is brought from the East Indies in large cakes or rolls. The best sort has a deep yellow or orange colour, shining fracture, and is free from impurities. It has no smell, and very little taste, unless kept in the mouth for some time, when it impresses a slight sense of acrimony. Neumann got from 16 ounces, 14 of alcoholic extract, and one of watery, and inversely 13 of watery, and two of alcoholic. He also found it almost entirely soluble in water, impregnated with a moderate proportion of fixed alkaline salt. According to my experiments, which confirm these observations, the watery solution is opaque and yellow. With alcohol it forms a transparent solution of a bright golden colour; and the residuum is totally soluble in water. The alcoholic solution is decomposed by water, becoming yellow and opaque; but the precipitate remains long suspended, and cannot be separated by common filtering paper. Ammoniated alcohol dissolves gamboge with similar phenomena. Gamboge is readily soluble in solution of potass, acquiring a bright red colour the moment it is thrown into it, and forming a dark-coloured solution, which is not decomposed by water; but the addition of any acid immediately produces a copious yellow precipitate, very soluble in excess of acid. It is also very soluble, but with decomposition, in acids. The acid solution is decomposed by water.

Medical use.—Gamboge evacuates powerfully both upwards and downwards; some condemn it as acting with too great violence, and occasioning dangerous hypercatharsis; while others are of a contrary opinion. Geoffroy seems particularly fond of this medicine, and informs us, that he has frequently given from two to four grains, without its proving at all emetic; that from four to eight grains both vomit and purge without violence; that its operation is soon over; and that, if given in a liquid form, and sufficiently diluted, it does not need any corrector; that in the form of a bolus or pill, it is most apt to prove emetic, but very rarely has this effect if joined along with *calomel.* He nevertheless cautions against its use where the patients cannot easily bear vomiting.

It has been used in dropsy with cream of tartar or jalap, or both, to quicken their operation. It is also recommended by some to the extent of fifteen grains, with an equal quantity of vegetable alkali, in cases of the tape-worm. This dose is ordered in the morning; and if the worm is not expelled in two or three hours, it is repeated even to the third time with safety and efficacy. It is asserted, that it has been given to this extent even in delicate habits.

It is an ingredient, and probably the active one, in most of the nostrums for expelling tæniæ.

STANNUM. *Lond. Ed. Dub.*

Off.—Stanni Limatura. *Lond. Dub. Ed.*
Stanni pulvis. *Dub. Ed.*
Tin filings, and powder of tin.

The general properties of tin have been already mentioned. It is found,

1. Sulphuretted, and combined with copper. Tin-pyrites.
2. Oxidized.
    - *a.* Combined with oxide of iron and silica. Common tinstone.
    - *b.* Combined with oxide of iron, and a little arsenic. Fibrous tinstone.

The best tin is found in Cornwall, or is brought from the East Indies. Its purity is estimated by its small specific gravity, and by the crackling noise it makes when bent.

It is now only used as an anthelmintic, especially in cases of tænia, and probably acts mechanically.

STYRAX.

Willd. g. 874. *Decandria Monogynia.*—Nat. ord. *Bicornes.*

Sp. 1. STYRAX OFFICINALE. *Ed. Lond. Dub.*

Off.—Balsamum Styracis officinalis. *Ed.*
Styracis Balsamum. *Lond.*
Styrax calamita; resina. *Dub.*
Storax, a balsam.

THIS tree grows in the Levant, Italy, and France. The storax flows from wounds made in the bark, in countries where the heat is sufficient, for neither in France nor in Italy does it furnish any. It occurs either in small distinct tears, of a whitish or reddish colour, or in large masses composed of tears, or in masses of an uniform texture, and yellowish red or brownish colour; though sometimes likewise interspersed with a few whitish grains.

The *common storax* of the shops is in large masses, considerably lighter and less compact than the foregoing; it appears on examination to be composed of a resinous juice, mixed with saw-dust.

Storax has an agreeable smell and an aromatic taste. Neumann got from 480 grains, 360 alcoholic, and 30 of watery extract; and inversely, 120 watery, and 240 alcoholic. In distillation it yielded benzoic acid. It is, therefore, a balsam, or natural combination of resin with benzoic acid.

Sp. 3. STYRAX BENZOIN. *Ed. Lond. Dub.*

Off.—Balsamum Styracis benzoini, *vulgo* Benzoinum. *Ed.*
Benzoinum; balsamum. *Lond.*
Benzöe; resina. *Dub.*
Benzoin. A balsam.

THIS species grows in Sumatra, and like the former, also furnishes a balsam on being wounded, which is brought from the East Indies, in large masses, composed of white and light brown pieces, with yellowish sprecks, breaking very easily betwixt the hands: that which is whitest, and freest from impurities, is most esteemed.

In its properties it differs from storax, only in containing a larger proportion of benzoic acid. Neumann found that it was totally soluble in alcohol, forming a blood-red tincture, and that water extracted no gummy matter, but a notable proportion of benzoic acid. By sublimation he got two ounces of impure acid from sixteen of benzoin. Lime and the alkaline carbonates dissolve the acid without attacking the resin, and are accordingly employed in the processes of Scheele, Gottling, and Gren, for obtaining the benzoic acid. I find that the solution of potass dissolves benzoin very rapidly, forming a dark coloured solution, mixed with fine crystals of benzoat of potass. This alkaline solution is not decomposed by water, but forms with acids a rose-coloured coagulum, easily soluble in excess of acid. Boiling nitrous acid also attacks benzoin with great violence, and dissolves it entirely ; the solution becomes turbid, and lets fall a copious precipitate on cooling, which, according to Mr. Brande, is benzoic acid. It is decomposed by water, and by alkaline solutions.

BORAS SODÆ; borax. *Ed.*
BORAS SODÆ; sub-boras sodæ. *Lond.*
BORAX; sub-boras sodæ. *Dub.*
Borate of soda. Sub-borate of soda. Borax.

BORAX is found only in Thibet and Persia. It is extracted from the waters of some wells and lakes by evaporation. In its impure state it is called tincal, and is brought from the East Indies in great masses, composed of a few large crystals, but chiefly of smaller ones, partly white and partly green, joined together as it were by a greasy yellow substance, intermixed with sand, small stones, and other impurities. By repeated solutions, filtrations, and crystallizations, it shoots into hexangular prisms, of which two sides are broader than the others, terminated by triangular pyramids, of a white colour, a styptic and alkaline taste, colouring vegetable blues green, soluble in eighteen parts of water at 60°, and in six at 212°, slightly efflorescing in the air, and when heated, swelling, and, with the loss of nearly half its weight, forming a porous friable mass, which in a greater heat melts into a transparent glass soluble in water. Besides the acids and alkalies, which have a greater affinity for its acid or bases than these have for each other, it is decomposed by sulphates, muriates, nitrates, phosphates, and fluates, of all the earths, and of ammonia. It consists of 39 boracic acid, 17 soda, and 44 water.

Medical use.—The medical virtues of borax have not been sufficiently ascertained by experience ; it is supposed to be, in doses of half a drachm or two scruples, diuretic and emmenagogue. Mr. Bisset recommends a solution of this salt in water, as the most powerful dissolvent yet known, of aphthous crusts in the mouth and fauces of children. And for the same purpose, it is often applied in the form of powder, mixed up with sugar. There are strong reasons to believe, that the virtues of borax are much greater than they are in general supposed to be, and that it may be more extensively used with advantage.

SUCCINUM. *Ed. Lond. Dub.*

Amber.

THIS is a solid, brittle, bituminous, substance, dug out of the earth, or found upon the sea-shores, especially along the coasts of Polish Prussia and Pomerania. It is of a white, yellow, or brown colour, sometimes opaque, and sometimes very clear and transparent.

It emits an agreeable smell when heated or rubbed. By friction it becomes electric; and when heated it softens, swells, and then melts, and burns with a greenish or bluish flame, leaving a coaly residuum. By distillation it affords a little acetous acid, an essential oil, and a peculiar acid, named from it the Succinic. It is not acted upon by water or diluted acids. It is imperfectly dissolved in alcohol and ether. Hoffmann dissolved it in oil of almonds in Papin's digester, and in a boiling solution of potass. Dr. Thomson has discovered that it is soluble in the cold, even in a very weak solution of the sub-carbonate of potass. Heyer ascertained that it was soluble, with decomposition, in nitrous acid. In attempting to form succinic acid by the action of nitrous acid or amber, I made the same observation. The acid, when heated to ebullition, acts violently ; copious red fumes are emitted, and the amber is first as if melted, and then dissolved. On cooling, part of the amber separates. The acid solution is decomposed by water, and by alkaline solutions. Amber is rendered soluble in the fixed and volatile oils, by melting or roasting it, or by the addition of a little camphor.

It is only used in pharmacy for the empyreumatic oil and acid obtained from it.

SULPHAS.

SULPHATE is a generic term for the combination of sulphuric acid with the alkalies, earths, and metallic oxides. Their generic characters have been already noticed. Like the other genera, they may be divided into three families.

Family 1. Alkaline sulphates.—These form no precipitate with alkaline carbonates.

Family 2. Earthy sulphates.—These are either insoluble in water, or if soluble, form a white precipitate with alkaline carbonates.

Family 3. Metalline sulphates.—These form precipitates, which are often coloured, with alkaline carbonates in general, with prussiate of potass and iron, and with gallic acid.

SULPHAS ALUMINÆ; alumen. *Ed.*
ALUMEN; supersulphas aluminæ et potassæ. *Lond.*
ALUMEN; supersulphas argillæ alcalisatæ. *Dub.*
Super-sulphate of alumina and potass. Alum.

ALUM is obtained principally from schitose clays, which contain iron pyrites, by roasting, exposure to the air, lixiviation, the addition of a proportion of potass ley, evaporation, and crystallization.

The roasting destroys the bituminous matters these clays commonly contain; the exposure to the air acidifies the sulphur of the pyrites; and the addition of alkali is absolutely necessary for the constitution of alum, which is a triple, or even quadruple salt with excess of acid, consisting of sulphuric acid, alumina, and potass, or ammonia, or all of them. The properties of alum do not seem to be affected by the nature of the alkali.

Alum crystallizes in regular octohedrons, whose sides are equilateral triangles. It has a sweetish, but very astringent taste. It is soluble in 15 times its weight of water at 60°, and in three fourths of its weight at 212°. It reddens vegetable blues. It effloresces slightly in the air. By the action of heat it first undergoes the watery fusion, then loses its water of crystallization, and lastly great part of its acid. It is decomposed by baryta, potass, soda, strontia, and all salts of which these are the bases; by the nitrate, muriate, phosphate, carbonate, borate, and fluate of ammonia; by the nitrate, muriate, phosphate, and carbonate of magnesia; and by the nitrate, muriate, and carbonate of lime. It is also decomposed by the gallic acid, by colouring matters, and by many animal and vegetable substances.

It commonly consists, according to Vauquelin, of 49 sulphate of alumina, 7 sulphate of potass, and 44 of water.

Medical use.—Alum is a powerful astringent: it is reckoned particularly serviceable for restraining hæmorrhagies and immoderate secretions; but less proper in intestinal fluxes. In violent hæmorrhagies, it may be given in doses of fifteen or twenty grains, and repeated every hour or half hour till the bleeding abates: in other cases, smaller doses are more adviseable; large ones being apt to nauseate the stomach, and occasion violent constipations of the bowels. It is used also externally, in astringent and repellent lotions and collyria. Burnt alum, taken internally, has been highly extolled in cases of colic. In such instances, when taken to the extent of a scruple for a dose, it has been said gently to move the belly, and give very great relief from the severe pain.

SULPHAS BARYTÆ. Terra ponderosa vitriolata. Barytes. *Ed.*
Sulphate of baryta. Ponderous spar.

This salt is found in great abundance in many countries, either in a loose earthy form, or compact, or foliated, or striated, or acicular. The foliated is in general the purest. Its specific gravity is from 4.4 to 4.865. It is insoluble in water. It is soluble in boiling concentrated sulphuric acid. It decrepitates when suddenly heated. By being formed into a thin cake with flour and water, and being afterwards heated to redness, it becomes phosphorescent. Heated to redness with charcoal, it is converted into a sulphuret, and it may be decomposed either by boiling, or in a crucible, with the carbonates of potass and of soda. It contains about 84 of baryta, and 16 sulphuric acid and water.

MAGNESIÆ SULPHAS; Sulphas Magnesiæ purificata. *Lond.*

SULPHAS MAGNESIÆ; Magnesia vitriolata; Sal cartharticus amarus. *Ed.*

SULPHAS MAGNESIÆ, *olim* Sal cartharticum amarum. *Dub.*

Sulphate of magnesia. Epsom salt. Bitter purging salt.

This salt is contained in several mineral springs, and also in sea water, from which it is obtained by evaporation. It crystallizes in tetrahedral prisms, has a very bitter taste, and is soluble in its own weight of water at 60°, and in three fourths of its weight of boiling water. Sulphate of magnesia, when perfectly pure, effloresces; but that of commerce generally contains foreign salts, such as the muriate of magnesia, which renders it so deliquescent that it must be kept in a close vessel or bladder. By the action of heat it undergoes the watery fusion, and loses its water of crystallization, but does not part with its acid. It is decomposed by baryta, strontia, the alkalies, and all the salts formed by these salifiable bases, excepting the alkaline muriates; and by the nitrate, muriate, and carbonate of lime.

Medical use.—It is a mild and gentle purgative, operating with sufficient efficacy, and in general with ease and safety, rarely occasioning any gripes, sickness, or the other inconveniences of resinous purgatives. Six or eight drachms may be dissolved for a dose in a proper quantity of common water; or four, five, or more, in a pint or quart of the purging mineral waters. These solutions may likewise be so managed as to promote evacuation by the other emunctories: if the patient be kept warm, they increase perspiration: and by moderate exercise in the cool air, the urinary discharge. Some allege that this salt has a peculiar effect in allaying pain, as in colic, even independently of evacuation.

It is, however, principally used for the preparation of the carbonate of magnesia.

SULPHUR SUBLIMATUM. Sulphuris flores. *Ed. Lond. Dub.*

Sublimed sulphur.

SULPHUR. *Lond.*

Roll Sulphur.

The physical and chemical properties of sulphur have been already mentioned.

In the neighbourhood of volcanoes it is sometimes found perfectly pure and crystallized; but all the sulphur of commerce is extracted from pyrites by sublimation. It is usually brought to us in large irregular masses, which are afterwards melted, and cast into cylindrical rolls, with the addition of some coarse resin, flour, or the like; whence the paler colour of the rolls.

Sulphur should be chosen of a bright yellow colour, should be very inflammable, and should burn with a bright pure blue flame. Sublimed sulphur is never prepared by the apothecary. It has the form of a very fine powder, having a beautiful yellow colour. It is often contaminated with a little sulphuric acid, formed during the process, from which it is easily freed by washing.

Medical use.—Sulphur stimulates the system, loosens the belly, and promotes the insensible perspiration: it seems to pervade the whole habit, and manifestly transpires through the pores of the skin, as appears from the sulphureous smell of persons who have taken it, and from silver being stained in their pockets of a blackish colour. In the stomach it is probably combined with hydrogen. It is a celebrated remedy against cutaneous diseases, particularly psora, both given internally, and applied externally. It has likewise been recommended in rheumatic pains, flying gout, rickets, atropha, coughs, asthmas, and other disorders of the breast and lungs, and particularly in catarrhs of the chronic kind. In hæmorrhoidal affections it is almost specific; but in most of these cases it is advantageously combined with some cooling purgative, especially super-tartrate of potass.

SUPERTARTRAS POTASSÆ. Supertartras potassæ purificata. *Lond.*

Super-tartris Potasssæ. *Ed.* Tartarus purificatus; Crystalli tartari. *Ed.*

Tartari Crystalli. *Dub.*

Super-tartrate of potass. Crystals of tartar, and cream of tartar.

SUPER-TARTRIS POTASSÆ IMPURUS, TARTARUS CRUDUS. *Ed.*

Tartarum. *Dub.*

Impure super-tartrate of potass. Tartar.

TARTAR exists in verjuice and in must, and is gradually deposited on the sides of the casks in which the wine is made, from which it is scraped before the next vintage, to prepare the casks to receive the new wine. The deepest coloured and coarsest wines generally give most tartar; and it gets the name of white or red tartar, according to its colour.

It is purified by dissolving it in boiling water, and filtrating the boiling solution, which, on cooling, deposites irregular crystals, containing the oily and colouring matters. These are separated by boiling the crystals with a white clay. At Venice, they are purified by dissolving them in water, and clarifying them with whites of eggs and ashes. The tartar, thus purified, when crystallized, or in powder, is called Cream of Tartar.

Its crystals are small and irregular, and do not melt in the mouth, but feel gritty under the teeth. It has an acid harsh taste. It is soluble in sixty times its weight of water at 60°, and in thirty at 212°. It is decomposed, and its acid is destroyed by heat. It contains 23 parts of potass, according to Bergmann, and 33, according to Thenard.

Medical use.—The virtues of tartar are those of a mild, cooling, aperient, laxative medicine. It is much used in dropsy; and some allege, that it has good effects as a deobstruent in dropsy from scirrhus. Taken from half an ounce to an ounce, it proves a gentle, though effectual purgative. Given in smaller doses, and in solution, it often acts as a powerful diuretic.

SUS SCROFA. *Ed. Lond.*

Cl. Mammalia.—Ord. *Pachyderma.*
The hog.

Off.—Adeps Sui scrofæ, *vulgo* Axungia porcina. *Ed.*
Adeps. *Lond.*
Adeps suillus. *Dub.*
The fat. Hogs-lard.

HOGS-LARD is a very pure animal fat, of a soft consistence. Hence it is emollient, and is a convenient article for the formation of ointments, plasters, and liniments.

SWIETENIA.

Willd. g. 843. *Decandria Monogynia.*—Nat. ord. *Trihilatæ.*

Sp. 1. SWIETENIA MAHAGONI. *Ed.*
Mahogany tree.

Off.—Cortex. The bark.

THIS majestic tree grows principally in Jamaica and in Spanish America. Its useful wood is universally known. Its bark is brown, rough, and scaly, on the branches grey and smoother. Its taste is very astringent, and more bitter than that of Peruvian bark. Its smell weak and aromatic. In its action on the living body, it is said to coincide nearly with Peruvian bark, and may be substituted for it in many situations.

Sp. 2. SWIETENIA FEBRIFUGA. *Ed. Dub.*
Febrifuge Swietenia.

Off.—Cortex. The bark.

THIS species, which, in many respects, resembles the former, is a native of the East Indies. Its bark is red, brittle, and compact, and covered with a rough grey cuticle. In its properties it agrees with the mahogany bark, and forms a very valuable substitute for Peruvian bark in the East Indies, where this last is so dear and scarce, and the diseases in which it is indicated so common. It is, however, merely an astringent bitter, and contains no cinchonin. Dr. Roxburgh sent from India a quantity of the extract of this bark, which could not be distinguished from the common kino of the shops.

TAMARINDUS INDICA. *Ed. Dub. Lond.*

Willd. g. 1250. *sp.* 1. *Monadelphia Triandria.*—Nat. ord. *Lomentaceæ.*
Tamarind tree.

Off.—Tamarindi pulpa; leguminis pulpa. *Lond.*
Tamarindus fructus. *Dub.*
Fructus conditus Tamarindi Indicæ. *Ed.*
The preserved fruit.

THIS tree grows both in the East and West Indies. The fruit is a broad ash-coloured pod. The external covering is thin and brittle, and contains several hard seeds, enveloped in a soft brown pulp. Tamarinds are preserved in two ways: commonly by throwing hot sugar from the boilers on the ripe pulp; but a better method is to put alternate layers of tamarinds and powdered sugar in a stone jar. By this means the tamarinds preserve their colour, and taste more agreeably.

East India tamarinds are longer than those from the West Indies; the former containing six or seven seeds each, the latter rarely above three or four.

Preserved tamarinds should be fresh and juicy, and should have an agreeable acid taste. They should not have a musty smell; the seeds should not be soft and swollen; and the blade of a knife should not get a coating of copper by being immersed amongst them.

Tamarinds contain sugar, mucilage, citric acid, super-tartrate of potass, tartaric acid, and malic acid.

Medical use.—The pulp of these fruits, taken in the quantity of from two or three drachms to an ounce or more, proves gently laxative and purgative, and, at the same time, by its acidity, quenches thirst, and allays immoderate heat. It increases the action of the sweet purgatives, cassia and manna, and weakens that of the resinous cathartics.

Salts, whose base is potass, form an improper addition to tamarinds, for they are decomposed, and the tartaric acid of the fruit is precipitated in the form of super-tartrate of potass.

TANACETUM VULGARE. *Ed. Dub.*

Willd. g. 1472. *sp.* 18. *Smith, g.* 360. *sp.* 1. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ discoideæ.*

Common tansy.

Off.—Folia Tanaceti vulgaris. *Ed.*
Folia Tanaceti. *Dub.*
The leaves.

Tansy is perennial, and grows wild by road-sides and the borders of fields, and is also frequently cultivated in gardens, both for culinary and medicinal uses: it flowers in June and August.

Medical use.—Considered as a medicine, it is a moderately warm bitter, accompanied with a strong, not very disagreeable flavour. Some physicians have had a great opinion of it in hysteric disorders, particularly those proceeding from a deficiency or suppression of the uterine purgations. The leaves and seeds have been in considerable esteem as anthelmintics. An infusion of tansy, drunk as tea, has been strongly recommended as a preventive of the return of gout.

TEUCRIUM.

Willd. g. 1093. *Smith, g.* 259. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ.*

Sp. 12. Teucrium Marum. *Dub.*
Syrian herb mastich.

Off.—Herba Mari Syriaci. *Dub.*
The herb.

This is a small shrubby plant, growing spontaneously in Syria, Candy, and other warm climates, and cultivated with us in gardens. The leaves have an aromatic bitterish taste, and when rubbed betwixt the fingers, a quick pungent smell, like volatile alkali, which soon affects the head, and occasions sneezing: distilled with water, they yield a very acrid, penetrating, essential oil, resembling that of scurvy-grass. These qualities sufficiently point out the uses to which this plant might be applied.

Sp. 36. *Willd.; sp.* 3. *Smith.* TEUCRIUM CHAMÆDRYS. *Dub.* Wall germander.

Off.—Herba Chamædryos. *Dub.*
The herb.

THIS perennial herb is found plentifully in the isle of Ely and near Cambridge. It flowers in July and August. It is an aromatic bitter, and is considered to be tonic and stimulant. An infusion of it is given in ague, chlorosis, and arthritis.

TOLUIFERA BALSAMUM. *Ed. Lond. Dub.*

Willd. g. 828. *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ.*

Off.—Balsamum Toluiferæ balsami. *Ed.*
Balsamum Tolutanum. *Lond. Dub.*
The balsam of Tolu.

THIS tree grows in Spanish America; the balsam flows from incisions made in its bark, during the hot season, and is brought to us in little gourd-shells. It is of a yellowish brown colour, inclining to red; in consistence thick and tenacious: by age it grows hard and brittle. The smell of this balsam is extremely fragrant, somewhat resembling that of lemons; its taste warm and sweetish. Lewis says, that he has sometimes procured benzoic acid from it. It yields very little volatile oil, although it impregnates the distilled water strongly with its flavour. By dissolving a proper quantity of sugar in this water, a more elegant syrup is obtained than that prepared in the common way, with a decoction of the balsam. In its medical virtues it agrees with the other balsams.

TORMENTILLA ERECTA. *Ed. Dub. Willd.*

TORMENTILLA OFFICINALIS. *Lond. Smith.*

Willd. g. 1001. *sp.* 1. *Smith,* g. 236. *sp.* 1. *Icosandria Polygynia.*—Nat. ord. *Senticosæ.*

Septfoil. Common tormentil.

Off.—Radix Tormentillæ erectæ. *Ed.*
Tormentillæ radix. *Lond. Dub.*
The root.

TORMENTIL is perennial, and found wild in woods and on commons: it has long slender stalks, with usually seven long narrow leaves at a joint; the root is for the most part crooked and knotty, of a blackish colour on the outside, and reddish within. It has an austere styptic taste, accompanied with a slight kind of aromatic flavour: it is one of the most agreeable and efficacious of the vegetable astringents, and is employed with good effect in all cases where medicines of this class are proper. Neumann got from 960 grains, 365 alcoholic, and 170 watery extract; and inversely, 570 watery, and 8 alcoholic.

TRITICUM.

Willd. g. 152. *Triandria Monogynia.*—Nat. ord. *Gramina.*

Sp. 2. TRITICUM HYBERNUM. *Ed. Lond. Dub.*
Wheat.

Off.—Farina Tritici hyberni. *Ed.* Farina. *Lond. Dub.*
Amylum Tritici hyberni. *Ed.* Amylum. *Lond. Dub.*
Flour, starch.

BY some spring and winter wheat are considered only as varieties, not as distinct species. The latter is the most productive, and is most commonly cultivated on that account; for there is no material difference between the grains they produce, which are indiscriminately employed for every purpose.

Wheat flour consists principally of gluten, starch, albumen, and a sweet mucilage. These may be separated by forming the flour into a paste with a little water, and washing this paste with fresh quantities of water, until it runs from it colourless. What remains is the gluten, which, if not the same with, is very analogous to the fibrine of animal substances. From the water with which the paste was washed, a white powder, *Amylum*, separates on standing. The albumen and sweet mucilage remain dissolved in the water. By evaporating it, the albumen first separates in white flakes, and the sweet mucilage may be got by total evaporation.

It is the presence of gluten which characterises wheat flour; and on the due admixture of it with the other constituents depends the superiority of wheat flour for baking bread.

Bread is made by working the flour into a paste with water, a quantity of some ferment, such as yeast, and a little muriate of soda to render it sapid, allowing the paste to stand until a certain degree of fermentation take place, and then baking it in an oven, heated to about 488°. During the fermentation, a quantity of gas is formed; and as it is prevented from escaping by the toughness of the paste, and dilated by the heat of the oven, the bread is rendered light and spongy. In this process the nature of the constituents of the flour is altered, for we are not able to obtain either gluten or starch from bread.

Medical use.—Bread is not only one of the most important articles of nourishment, but is also employed in pharmacy for making cataplasms, and giving form to more active articles. An infusion of toasted bread has a deep colour and pleasant taste, and is an excellent drink in febrile diseases, and debility of the stomach.

Amylum.

Starch.—The general properties of starch have been already enumerated. It is found in many vegetables, combined with different substances. Fourcroy, accordingly, makes various species of it; as, combined,

1. With gluten or fibrine; as in wheat, rye, and other similar seeds.
2. With extractive; as in beans, peas, lupins, &c.
3. With mucilaginous matter; as in the potatoe, and many other roots, in unripe corn.
4. With saccharine matter; in most roots, and in corn after it has begun to germinate.
5. With oil; in the emulsive seeds, almonds, &c.
6. With an acrid principle; as in the root of the burdock, jatropha manihot, arum, asarum, and other tuberous roots.

Medical use.—As a constituent of many vegetable substances, it forms a most important alimentary substance. In a medical point of view, it is to be considered as a demulcent; and accordingly, it forms the principal ingredient of an officinal lozenge, and a mucilage prepared from it often produces excellent effects, both taken by the mouth, and in the form of a clyster in dysentery and diarrhœa, from irritation of the intestines.

TUSSILAGO FARFARA. *Ed. Lond. Dub.*

Willd. g. 1483. *sp.* 12. *Smith, g.* 360. *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ.*

Colts foot.

Off.—Folia Tussilaginis farfaræ. *Ed.* Tussilago. *Lond. Dub.*
Flores Tussilaginis farfaræ. *Ed.*
The herb and flowers.

This herb grows wild in moist situations, producing yellow flowers in March and April, which soon are succeeded by large roundish leaves, hairy underneath; their taste is herbaceous, somewhat glutinous and subacrid.

Medical use.—Colts foot is recommended in coughs, phthisis, and other disorders of the breast and lungs, and some use it in scrofula. Its effects probably depend more on the milk in which it is commonly directed to be taken, than on the tussilage itself.

ULMUS CAMPESTRIS. *Ed. Lond. Dub.*

Willd. g. 505. *sp.* 1. *Smith, g.* 117. *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Scabridæ.*

Common elm.

Off.—Cortex interior Ulmi campestris. *Ed.*
Ulmi cortex. *Lond.*
Ulmi cortex interior. *Dub.*
The inner bark.

This tree grows wild in Britain. It flowers in April. The inner bark has a yellowish colour, and a mucilaginous, bitter, astringent taste, without smell.

In decoction it has been highly recommended in the lepra ichthyosis, and has been said to cure dropsies, but it requires a patient trial.

VALERIANA OFFICINALIS. *Ed. Dub.* (Sylvestris).

VALERIANA OFFICINALIS SYLVESTRIS. *Lond.*

Willd. g. 75. *sp.* 6. *Smith, g.* 15. *sp.* 3. *Triandria Monogynia.*—Nat. ord. *Aggregatæ.*

Wild valerian.

Off.—Radix Valerianæ officinalis. *Ed.*
Valerianæ radix. *Lond. Dub.*
The root.

This plant is perennial, and varies in its appearance and sensible qualities, according to the situation in which it grows. In marshes and shadowy places its leaves are broader, on dry heaths and high pastures they are narrower. The roots produced in low watery grounds have a remarkably faint smell in comparison with the others, and sometimes scarcely any. The roots taken up in autumn or winter have also much stronger sensible qualities than those collected in spring and summer.

The root consists of a number of strings or fibres matted together, issuing from one common head, of a whitish or pale brownish colour. Its smell is strong, like a mixture of aromatics with fetids; the taste unpleasantly warm, bitterish, and subacrid. Neumann got from 480 grains of the dry root 186 alcoholic, and 74 watery extract; and inversely, 261 watery and 5 alcoholic. The distilled alcohol was slightly, the water strongly, impregnated with the smell of the valerian, but no separable oil was obtained.

Medical use.—Wild valerian is a medicine of great use in nervous disorders, and is particularly serviceable in epilepsies proceeding from a debility of the nervous system. Some recommend it as procuring sleep, particularly in fever, even when opium fails; but it is principally useful in affections of the hysterical kind.

The common dose is from a scruple to a drachm in powder; and in infusion, from one to two drachms. Its unpleasant flavour is most effectually concealed by a suitable addition of mace.

As its virtues reside entirely in an essential oil, it should not be exhibited in decoction or watery extract.

VERATRUM ALBUM. *Ed. Lond. Dub.*

Willd. g. 1859. *sp.* 1. *Polygamia Monoecia.*—Nat. ord. *Liliaceæ.*

White hellebore.

Off.—Radix Veratri albi. *Ed.*
Veratri radix. *Lond.*
Hellebori albi radix. *Dub.*
The root.

THIS plant grows spontaneously in Switzerland and the mountainous parts of Germany. The root has a nauseous, bitterish, acrid taste, burning the mouth and fauces. On being wounded, it emits an extremely acrimonious juice, which, when inserted into an wound, is said to prove very dangerous. Neumann got from 960 grains 560 watery and 10 alcoholic extract; and inversely, 420 alcoholic and 180 watery. Nothing rose in distillation.

Medical use.—The powder of the dried root, applied to an issue, occasions violent purging; snuffed up the nose, it proves a strong, and not always a safe sternutatory. Taken internally, it acts with extreme violence as an emetic, and has been observed, even in a small dose, to occasion convulsions, and even death. The ancients sometimes employed it in very obstinate cases, and always made this their last resource. Modern practice seems to have almost entirely rejected its internal use, though some have ventured upon so large a dose as a scruple, in maniacal cases, and are said to have experienced good effects from it.

VERONICA BECABUNGA. *Dub.*

Willd. g. 44. *sp.* 30. *Smith, g.* 9. *sp.* 8. *Diandria Monogynia.*—Nat. ord. *Personatæ.*

Brooklime.

Off.—Herba Beccabungæ. *Dub.*
The herb.

This is a low perennial plant, common in little rivulets and ditches of standing water, and flowering in July. The leaves remain all the winter, but are in greatest perfection in the spring. Their taste is herbaceous, with a very light bitterness.

If any good effects be expected from brooklime, it should be used as food.

VIOLA ODORATA. *Ed. Lond. Dub.*

Willd. g. 446. *sp.* 12. *Smith, g.* 96. *sp.* 2. *Pentandria Monogynia.*—Nat. ord. *Campanaceæ.*

Sweet violet.

Off.—Flores Violæ odoratæ. *Ed.*
Violæ flores. *Dub. Lond.*
The recent flower.

This plant is perennial, and is found wild under hedges and in shady places; but the shops are generally supplied from gardens. It flowers in March and April. Its flowers are so remarkable for their odour and colour, that they have given a name to both. In our markets we meet with the flowers of other species: these may be distinguished from the foregoing by their being larger, of a pale colour, and having no smell.

Medical use.—They impart their colour and flavour to aqueous liquors: a syrup made from the infusion has long had a place in the shops, and is said to be an agreeable and useful laxative for children, but is chiefly valued as a delicate test of the presence of uncombined acids or alkalies, the former changing its blue to a red, and the latter to a green colour.

VITIS VINIFERA. *Ed. Dub. Lond.*

Willd. g. 453, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Hederaceæ.*

The vine.

The vine grows in temperate situations in many parts of the world, and is cultivated very generally for the sake of its agreeable subacid fruit. Before they are ripe, grapes are extremely harsh and acid, and by expression furnish a liquor which is called Verjuice. It contains malic acid, super-tartrate of potass, and extractive, and may be made to furnish wine by the addition of sugar. As the grape advances to maturity, the quantity of sugar in it increases, while that of malic acid diminishes: it, however, never disappears entirely. When thoroughly ripe, the grape is one of the most agreeable fruits. It is cooling, antiseptic, and nutritious, and when eaten in considerable quantity, diuretic and gently laxative. In inflammatory diseases, and all others where acids are indicated, grapes form an excellent article of diet.

FRUCTUS SICCATUS VITIS VINIFERÆ, *vulgo* Uva passa. *Ed.*
Uvæ passæ sole siccatæ. *Dub.*
Uvæ passæ; baccæ præparatæ. *Lond.*
Sun raisins.

RAISINS are grapes which have been carefully dried. By this means not only the water they contained is dissipated, but the quantity of acid seems to be diminished. They become more saccharine, mucilaginous, and laxative, than the recent grape, but are less cooling.

VINUM ALBUM HISPANUM; fructus succus fermentatus. *Ed.*
VINUM; Vinum album Hispanicum, *vulgo* SHERRY. *Lond.*

WINE is the juice of the grape altered by fermentation. The numerous varieties of wine depend principally on the proportion of sugar contained in the must, and the manner of its fermentation. When the proportion of sugar is sufficient, and the fermentation complete, the wine is perfect and generous: if the quantity of sugar be too large, part of it remains undecomposed, as the fermentation is languid, and the wine is sweet and luscious; if, on the contrary, it be too small, the wine is thin and weak; and if it be bottled before the fermentation be completed, it will proceed slowly in the bottle, and, on drawing the cork, the wine will sparkle in the glass, as for example, Champaigne. When the must is separated from the husk of the grape before it is fermented, the wine has little or no colour: these are called White wines. If, on the contrary, the husks are allowed to remain in the must while the fermentation is going on, the alcohol dissolves the colouring matter of the husks, and the wine is coloured: such are called Red wines. Besides, in these principal circumstances, wines vary much in flavour. The red wines most commonly drunk in this country are Port, which is strong and austere, containing much tannin, and Claret, which is thinner and highly flavoured. Our white wines are all strong, Hock, Madeira, Sherry, Lisbon, and Malaga. Of these Hock is the most acidulous, and Malaga the sweetest.

Medical use.—Wine, taken in moderate quantities, acts as a beneficial stimulus to the whole system. It promotes digestion, increases the action of the heart and arteries, raises the heat of the body, and exhilarates the spirits. Taken to excess, it produces inebriety, which is often succeeded by headach, stupor, nausea, and diarrhœa, which last for several days. Habitual excess in wine debilitates the stomach, produces inflammation of the liver, weakens the nervous system, and gives rise to dropsy, gout, apoplexy, tremors, and cutaneous affections.

To convalescents, and in all diseases of general debility, and deficiency of the vital powers, wine is the remedy on which we must place our chief dependence; and when properly administered, its effects are often scarcely credible.

WINTERA AROMATICA. *Ed.*

Willd. g. 1063. *Polyandria Tetragynia.*—Nat. ord. *Oleraceæ.*

Off.—Cortex Winteræ aromaticæ, vulgo Winteranus cortex.

This is the produce of a tree first discovered on the coast of Magellan by Captain Winter, in the year 1567. The sailors then employed the bark as a spice, and afterwards found it serviceable in the scurvy; for which purpose it is at present also sometimes made use of in diet drink. The true Winters bark is not often met with in the shops, Canella alba being generally substituted for it; and by some they are reckoned to be the same: there is, however, a considerable difference betwixt them in appearance, and a greater in quality. The Winters bark is in larger pieces, of a more cinnamon colour than the canella, and much warmer and more pungent. Its smell resembles that of cascarilla. Its virtues reside in a very hot, stimulant, volatile oil.

ZINCUM. *Ed. Dub. Lond.*

Zinc.

The general properties of zinc have been already noticed. It is always found oxidized,

1. Combined with a greater or less proportion of carbonic acid. Calamine.
2. Combined with sulphur. Blende.
3. Combined with sulphuric acid, generally in solution.

The ores of zinc are rarely worked by themselves, or with the sole intention of extracting zinc, but are generally melted with the lead ores, particularly galena, which they commonly accompany. By this process the zinc is obtained in two forms; part of it is sublimed in the state of an oxide, and attaches itself to the chimney of the furnace, in the form of a grey, granular, earthy-like incrustation, which is known by the name of Tutty or Cadmia; and part of it is sublimed in its metallic form, and is condensed in the throat of the chimney, in small grains, which are afterwards melted in a crucible, and cast in ingots.

OXIDUM ZINCI IMPURUM; TUTIA. *Ed.*
Tutia. *Dub.*
Impure oxide of zinc. Tutty.

IT is moderately hard and ponderous; of a brownish colour, and full of small protuberances on the outside, smooth and yellowish within; some pieces have a bluish cast, from minute globules of zinc in its metallic form. Tutty is celebrated as an ophthalmic, and frequently employed as such in unguents and collyria.

CARBONAS ZINCI IMPURUS, Lapis Calaminaris. *Ed.*
CALAMINARIS, Oxidum zinci in usum eorum, qui Orichalcum conficiunt. *Dub.*
CALAMINA, carbonas zinci impura. *Lond.*
Impure carbonate of zinc. Calamine.

THIS mineral is found plentifully in England, Germany, and other countries, either in distinct mines, or intermingled with the ores of different metals. It is usually of a greyish, brownish, yellowish, or pale reddish colour, without lustre or transparency; fracture commonly uneven or earthy; considerably hard. Before the blow-pipe it decrepitates, but does not melt, and becomes yellower, and is sublimed. It is partly soluble in acids, and often effervesces with them.

Mr. Smithson has analysed several varieties of calamine.

	Sp. Grav.	Ox. of Zinc.	Carb. Acid.	Water.	Quartz.
Derbyshire	4.333	65.2	34.8		
Somersetshire	4.336	64.8	35.2		
Carinthia	3.598	71.4	13.5	15.1	
Hungary	3.434	68.3		4.4	25.
Fribourg		38.		12.	50.

Calamine is generally roasted before it comes into the shops, to render it more easily reducible into a fine powder. In this state it is employed in collyria, against defluctions of thin acrid humours upon the eyes, for drying up moist running ulcers, and healing excoriations.

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APPENDIX.

No. I.

List of Substances contained in some of the latest and most esteemed Foreign Pharmacopœias, but not inserted in the Materia Medica of any of the British Colleges.

EXPLANATION OF THE ABBREVIATIONS.

1. Brem.—Pharmacopœia in usum officinarum reipublicæ Bremensis conscripta. 8vo. Bremæ, 1792.

2. Aust. prov.—Pharmacopœia Austriaco-provincialis, emendata. 8vo. Viennæ, 1794.

3. Aust. cast.—Pharmacopœia Austriaco-castrensis. 8vo. Ticini, 1795.

4. Ross.—Pharmacopœia Rossica. 8vo. *Petropoli*, 1798.

5. Mar.—Apparatus medicaminum nosocomiis, generatim curationi ægrotorum, pauperum maxime accomodus Francisci Marabelli. 8vo. Patavii, anno Reipub. Gall. VIto. 1798.

6. Bor.—Pharmacopœia Borussica. 4to. Berolini, 1799.

7. Gen.—Formulario Farmaceutico per uso dell' Ospedale di Pammatone. 8vo. Geneva, 1800.

8. Van. M.—Pharmacopée manuelle, par J. B. Van Mons. 8vo. A. Bruxelles, an. IX. 1801.

9. Brugn.—Pharmacopœia ad uso degli speziali, e medici moderni della repubblica Italiana, di. L. Brugnatelli. 8vo. *Pavia*, 1802.

10. La. G.—Manuel du Pharmacien, par E. J. B. Bouillon La Grange. 8vo. A Paris, an. XI. 1803.

11. Parm.—Code Pharmaceutique, à l'usage des hospices civiles, des secours à domiciles, et des prisons, publié par ordre du Ministre de l'interieur. Par A. A. Parmentier. 8vo. Paris, 1803.

12. Al.—Nouveaux elemens de Therapeutique et de Matiere Medicale. Par J. L. Alibert. 8vo. Paris, an. XII.

13. Coxe.—The American Dispensatory, by John Redman Coxe, M.D. Philadelphia, 1806.

1. Achillea Millefolium. *Millefollii herba, flores.* Ross. Aust. prov. Brem. Bor. La G.
Smell somewhat aromatic; taste slightly astringent and bitterish; effects stomachic and tonic.

2. Achillea Nobilis. *Millefolii nobilis herba, flores.* Ross.
Smell camphoraceous and aromatic, preferable in every respect to the preceding species.

3. Achillea Ptarmica. *Ptarmicæ radix; herba cum floribus.* Ross.
No smell; taste acrid; effects sialogogue, sternutatory.

4. Adiantum Capillus Veneris. *Capillus veneris; herba.* Aust. prov. Van M. La G.
Used for preparing the syrup called Capillaire.

5. Agaricus Muscarius. Ross.
Smell fetid; taste acrid; effects inebriating, and inducing delirium.

6. Alcea Rosa. *Malvæ arboreæ flores.* Ross. Brem. Bor.
No smell; taste mucilaginous and sub-astringent; effects emollient and sub-astringent.

7. Ambra Ambrosiaca Grysea. *Ambra grysea.* Ross. Bor. Van M.
Smell agreeable; taste resinous and aromatic; effects exciting and augmenting the nervous power.

8. Amomum Circuma. Van M. *Curcumæ radix.* Bor.
Taste bitterish, aromatic.

9. Amomum Grana Paradisi. *Grana paradisi.* Brem. La G.
Smell slightly aromatic; taste acrid; effects stimulating.

10. Amygdalus Nana. *Nuclei.* Ross
No smell; bitterish taste; a substitute for sweet almonds.

11. Amygdalus Persica. *Flores.* Van. M. La G.
Aromatic; bitter; laxative.

12. Anagallis Arvensis. *Anagallis. Herba.* Aust. prov. Brem. Ross. Bor.
No smell; taste at first herbaceous, afterwards bitter, and somewhat acrid.

13. Andromeda Mariana. Coxe.
Probably poisonous; used in decoction as a wash for the ground itch or toe itch of the slaves in America.

14. Anemone Pratensis. *Pulsatillæ nigricantis herba.* Ross. Aust. prov. Brem.
Smell slight; taste acrid, caustic, durable; effects diuretic and stimulant.

15. Anemone Nemorosa. *Ranunculi albi flores, et herba recens.* Ross.
Smell slight; taste acrid; effects rubefacient and blistering.

16. Annona Triloba. *Fructus siccatus.* Coxe.
Purgative.

17. Antirrhinum Linaria. *Linaria.* Aust. prov. Brem. Bor.
Smell urinous; taste bitterish; effects diuretic.

18. Aralia Spinosa. *Cortex, bacca.* Coxe.
Rheumatism, toothach; acrid, sudorific, sialogogue.

19. Aralia Nudicaulis. *Radix.* Coxe.
Tonic; a substitute for sarsaparilla.

20. Aristolochia Clematitis. *Aristolochia vulgaris. Radix.* Ross.
Smell fragrant, but heavy; taste bitter, durable; effects diuretic, emmenagogue.

21. Aristolochia Longa. *Radix.* La G.

22. Aristolochia Rotunda. *Radix.* Brem. Bor. La G.
Smell, taste, and effects similar to those of the preceding species.

23. Aristolochia Sipho. Coxe.
Substitute for snake-root.

24. Aristolochia Trilobata. *Stipites; radix.* Ross.
Smell fragrant, strong; taste bitterish, corresponding with the smell; effect diaphoretic.

25. Artemisia Pontica. *Absinthium ponticum; herba.* Aust. prov.
Similar to A. absinthium, but weaker.

26. Arum Triphyllum. *Radix recens.* Coxe.
Acrid; expectorant; boiled in milk, in consumption; as a poultice in tinea capitis.

27. Asarum Canadense. *Succus foliorum expressus. Folium.* Coxe.
Emetic; errhine.

28. Asclepias Decumbens. *Radix.* Coxe.
Escharotic, cathartic, sudorific, diuretic.

29. Asclepias Vincetoxicum. *Radix.* La G.
Stimulant cordial; diaphoretic.

30. Asparagus Sativa. *Radix.* La G.
Taste bitter-sweet; mucilaginous; aperitive, imparting its smell to the urine.

31. Asplenium Scolopendrium. *Folia.* Van M.
Sub-astringent.

32. Astragalus Exscapus. *Radix.* Ross. Aust. prov. Brem.
No smell; taste bitterish and sub-astringent; effects demulcent, and falsely supposed anti-syphilitic.

33. Aurum. La G.

34. Bellis Perennis. *Flos. Folium.* Aust. prov.
No smell; taste slightly acrid.

35. Betonica Officinalis. *Folia.* La G.
Aperitive.

36. Betula alnus. *Alni folia.* Ross.
No smell; taste astringent and bitterish; effects discutient and vulnerary.

37. BISMUTHUM, vulgo MARCASITA. Bor.
A very brittle, fusible, and volatile metal. White oxide has specific effects in Gastrodynia.

38. BITUMEN ASPHALTUM. *Asphaltum.* Bor.
A black friable bitumen, shining in its fracture.

39. BOLETUS LARICIS. *Agaricus Albus. Agaricus chirurgorum.* Brem. Aust. prov. Bor. Van M. La G.
Taste nauseous and bitter; effects emetic, carthartic, drastic.

40. BOLETUS SALICIS. Bor.
An unequally porous fungus growing on the willow, and diffusing an aromatic smell, especially after rain.

41. BOLUS ALBA. Aust. prov.

42. BOLUS ARMENA. Aust. prov. Bor. Van M.
No smell; adheres to the tongue; effects exsiccative.

43. BORAGO OFFICINALIS. *Folia, flores.* Van M. La G.
Saline; aperitive.

44. BOS TAURUS. *Lac vaccinum.* Aust. prov. Gen. Bor. Van M.
Nutritious; demulcent.
Serum lactis vaccini. Mar.
Attenuant; antiseptic.
Saccharum lactis. Bor.
Nutritious; demulcent.
Butyrum. Van M.
Unctuous.
Sevum Bovinum. Ross. Aust. cast.
Unctuous, emollient.
Fel tauri. Bor. Mar. Van M.
Stomachic.

45. BRASSICA (ERUCA). *Erucæ semina.* Ross. Bor.
Smell heavy; taste acrid; effects stimulant.

46. BRUNELLA VULGARIS. *Folia.* La G.
Vulnerary; astringent.

47. BUBON MACEDONICUM. *Semina.* La G.
Acrid, aromatic.

48. BUGLOSSUM OFFICINALE. *Folia. flores.* La G.
Demulcent.

49. CALENDULA OFFICINALIS. *Calendula.* Aust. prov. Van M.
Taste bitterish.

50. CANNABIS SATIVA. *Cannabis. Semina.* Ross. Brem. Bor. Van M.
Smell weak; taste mawkish; effects emollient, anodyne.

51. CARDUUS MARIANUS. *Carduus Mariæ. Semen.* Brem.
Emulsive.

52. CAREX ARENARIA. *Radix.* Ross. Bor.
Smell agreeable, but not strong; effects demulcent, resolvent.

53. CARLINA ACAULIS. *Carlinæ, seu Cardopathiæ Radix.* Bor. La G.
Taste very acrid and bitter; smell somewhat aromatic, but nauseous.

54. CARTHAMUS TINCTORIUS. *Grana.* La G.
Cathartic.

55. CASSIA MARILANDICA. *Folia.* Coxe.
Purgative.

56. CERATONIA SILIQUA. *Siliqua dulcis.* Ross. Aust. prov. Brem. Bor.
No smell; taste sweet; effects edulcorant, expectorant.

57. CHELIDONIUM MAJUS. *Radix, herba recens.* Ross. Aust. prov. Brem.
Smell heavy; taste acrid, bitterish, durable; effects acrid, purgative; when dried, aperient, diuretic.

58. CHENOPODIUM AMBROSIOIDES. *Chenopodii herba.* Brem. Bor. Van M.
Smell strong, fragrant; taste acrid, aromatic; effects stimulant, carminative, anthelmintic.

59. CHENOPODIUM BOTRYS. *Botrys vulgaris. Herba.* Ross. Van M.
Qualities and effects similar to, but stronger than those of the preceding species.

60. CHENOPODIUM ANTHELMINTICUM. *Succus expressus. Semen.* Coxe.
Smell strong; taste aromatic, bitter, acrid; effects anthelmintic.

61. CHIRONIA ANGULARIS. *Herba.* Coxe.
Bitter; tonic.

62. CICHORIUM INTYBUS. *Cichorii radix, herba.* Ross. Aust. prov. *et* cast. Brem. La G. Van M. Gen. Bor. Mar.
No smell; taste of the herb agreeably bitter, of the root intensely bitter; effects aperient, tonic, diuretic.

63. CICUTA VIROSA. *Herba.* Bor.
Smell heavy; narcotic.

64. CLEMATIS ERECTA. *Flammulæ Jovis folia, flores.* Ross. Aust. prov. Bor. Van M.
Smell weak; taste acrid, blistering; effects diuretic, sudorific.

65. CLEMATIS CRISPA. *Clematis viorna. Folia.* Coxe.
Acrid; chronic rheumatism, palsy, old ulcers; doses small.

66. CLEOME DODECANDRA. *Radix.* Coxe.
Fetid; anthelmintic.

67. COLUBER VIPERA. La G.
Nutritious.

68. CONFERVA DICHOTOMA. *Fucus helminthocortos. Helminthocorton.* Ross. Brem. Gen. Bor. Mons.
Smell marine, fetid; taste saline; effects purgative, anthelmintic.

69. Convallaria Majalis. *Liliorum convallium flores.* Bor. Mons. La G.
Aromatic; cephalic.

70. Convolvulus Americanus. *Mechoacanha; radix.* Brem. La G.
Taste at first sweetish, then sub-acrid; effect purgative.

71. Convolvulus Turpethum. *Radix.* Van M.
Cathartic.

72. Convolvulus Panduratus. *Radix.* Coxe.
Purgative; and in calculous complaints.

73. Cordia Myxa. *Fructus.* La G.
Pectoral.

74. Cornus Florida. *Cortex.* Coxe.
Astringent, bitter; intermittents, flatulent colic.

75. Cornus Sericea, *Cortex.* Coxe.
Intermittents.

76. Cucumis Melo. *Melo. Semen.* Aust. prov.
Emulsive.

77. Cucurbita Pepo. *Pepo. Semen.* Aust. prov. Bor.
Emulsive.

78. Cycas Circinalis. *Sago grana.* Ross. Brem.
Amylaceous; nutritious.

79. Cynoglossum Officinale. *Radix.* Van M. La G.
Astringent; inspissant.

80. Cynomorium Coccineum. *Fungus Melitensis.* Ross.
No smell; taste styptic, bitterish, saline; effects roborant, astringent,

81. Cytinus Hypocistis. *Hypocistis. Succus inspissatus.* Aust. prov.
Taste acrid, austere; effect astringent.

82. Dictamnus Albus. *Radix.* Aust. prov. Brem. Bor. La G.
Smell fragrant; taste bitter, sub-aromatic; effects tonic, anthelmintic.

83. Digitalis Epiglottis. *Folia.* Gen.
An Italian substitute for the D. purpurea.

84. Diospyros Virginana. *Cortex, fructus maturus.* Coxe.
Intermittents, ulcerous sore throats, worms.

85. Dirca Palustris. *Cortex recens.* Coxe.
Epispastic.

86. Dracontium Pertusum. *Folia.* Coxe.
Anasarca; diaphoretic, epispastic.

87. Epidendrum Vanilla. *Vanillæ siliqua.* Ross. Van M. La G.
Smell fragrant, balsamic; taste aromatic, sub-acid, unctuous; effects heating, diuretic.

88. Erigeron Philadelphicum. Coxe.
Gout, gravel, emenagogue, diuretic, sudorific.

89. ERYNGIUM CAMPESTRE. *Radix.* La G.
Aperitive; diuretic.

90. ERYNGIUM AQATICUM. Coxe.

91. ERYSIMUM OFFICINALE. *Erysimum. Herba.* Brem. La G.
Taste acrid; effects astringent, diuretic.

92. EUPATORIUM CANNABINUM: *Folia.* Van M.
Smell acrid, penetrating; taste intensely bitter; diuretic; emetic; cathartic.

93. EUPATORIUM PERFOLIATUM. *Flores, folia.* Coxe.
Bitter, sudorific; emetic; intermittents, fevers.

94. EUPHORBIA OFFICINALIS. *Euphorbii Gummi.* Ross. Aust. prov. Bor. Van M.

No smell; taste, at first none, then pungent, burning; effects acrid, drastic.

95. EUPHORBIA IPECACUANHA. *Radix.* Coxe.
Emetic.

96. EUPHRASIA OFFICINALIS. *Herba.* Van M. La G.
Ophthalmic.

97 FAGARA OCTANDRA. *Tacamahaca. Gummi-resina.* Ross. Bor.

Smell fragrant, like lavender; taste bitterish, nauseous; effects tonic, stimulant.

98. FICUS INDICA RELIGIOSA. *Laccæ Gummi.* Ross. Brem. Bor.
Resinous.

99. FORMICA RUFA. *Formicæ cum acervo.* Ross. Brem. Bor.
Qualities and effects depend on the little acetous acid they contain.

100. FRAGARIA VESCA. *Radix.* Van M.
Refrigerant; diuretic.

101. FRASERA CAROLINENSIS. *Radix.* Coxe.
A substitute for gentian.

102. GADUS LOTA. *Mustela fluviatilis. Liquamen hepatis.* Aust. prov.
Nauseous; diuretic, carthartic; chronic rheumatism.

103. GALEGA VIRGINIANA. *Radix.* Coxe.
Anthelmintic.

104. GENTIANA PANNONICA. *Gentiana. Radix.* Aust. prov. et cast.
Qualities and effects the same as those of the gentiana lutea.

105. GERANIUM MACULATUM. *Radix,* Coxe.
Cholera infantum, syphilis.

106. GEUM RIVALE. *Gei palustris radix.* Ross.
Smell weak; taste styptic, austere; effects tonic, astringent, febrifuge.

107. GEUM URBANUM. *Caryophyllatæ radix.* Ross. Aust prov. Brem. Bor. La G.

Smell caryophyllaceous, lost by drying; taste styptic, bitter; effects tonic, astringent, febrifuge; said to be an excellent substitute for Peruvian bark.

108. GLECOMA HEDERACEA. *Hedera terrestris. Herba.* Aust. prov. Brem. Bor Van M La G.
Taste bitterish, sub-acrid; effects expectorant, roborant.

109. GLYCYRRHIZA ECHINATA. *Liquiritia, radix.* Bor.
A Russian substitute for the G glabra.

110. GUALTHERIA PROCUMBENS. Coxe.
Stimulant, anodyne; asthma.

111. GUILANDINA MORINGA. *Nuces Behen.* Bor.
Oily.

112. HEDERA HELIX. *Gummi-resina.* La G.
Agglutinant.

113. HEUCHERA AMERICANA. *Radix.* Coxe.
Astringent; wounds, ulcers, cancers.

114. HUMULUS LUPULUS. *Lupuli strobuli.* Bor. La G.
Agreeably bitter; anodyne, diuretic, resolvent.

115. HYDRASTIS CANADENSIS. *Radix.* Coxe.
Bitter, strong narcotic smell; tonic, ophthalmia, cancer.

116. HYPERICUM QUADRANGULARE. *Hypericum. Flores.* Brem.
Smell agreeable; taste bitterish, sub-astringent; balsamic; effects vulnerary.

117. ILEX AQUIFOLIUM. *Aquifolii folia.* Ross. Bor.
No smell; taste astringent; effects febrifuge, antiarthritic.

118. ILLICIUM ANISATUM. *Anisatum stellatum. Fructus.* Aust. prov. Brem. Ross Bor. Van M. La G.
Smell aromatic; taste agreeable, like anise; effects pectoral, carminative, diuretic.

119. IMPERATORIA OSTRUTHIUM. *Imperatoriae radix.* Ross. Aust. prov.
Smell aromatic; taste warm, pungent, very durable; effects stimulant, carminative, sudorific, diuretic.

120. IRIS VERSICOLOR ET VERNA. Coxe.
Cathartic.

121. JASMINUM OFFICINALE. *Jasmini flores.* Ross. Brem.
Smell fragrant; taste bitterish; used as a perfume.

122. JUGLANS CINEREA. *Cortex interior.* Coxe.
Epistastic; carthartic.

123. KALMIA LATIFOLIA. *Folia.* Coxe.
Narcotic. tinea capitis, herpes, psora, syphilis.

124. LACTUCA SATIVA. *Folia.* La G.
Refreshing; anodyne.

125. LAMIUM ALBUM. *Flores.* Van M. La G.
Astringent; tonic.

126. Laurus Pechurim. *Faba.* Van. M.
Bitter, aromatic; stimulant, stomachic.

127. Ledum Palustre. *Rorismarini sylvestris herba.* Ross. Aust. prov. Bor.
Smell heavy, sub-aromatic; taste bitterish, sub-astringent; effects resolvent, diuretic.

128. Lepedium Sativum. *Folia, semina.* La G.
Antiscorbutic, aperitive, diuretic.

129. Lichen Pulmonarius. La G.
Taste saline, bitter; pectoral.

130. Ligusticum Levisticum. *Levistici herba, radix, semen.* Ross. Aust prov. Brem. Bor.
Smell unpleasant; taste warm, aromatic; effects stimulant, carminative, sudorific.

131. Liquidambar Styracifluum. *Styrax Liquida. Balsamum.* Aust. prov. Bor. Van M. La G.
Smell fragrant; taste acrid, aromatic; effects stimulating, heating.

132. Liquidambar Asplenifolium. Coxe.
Diarrhœa, hæmorrhagy.

133. Liriodendron Tulipifera. *Cortex.* Coxe.
Intermittents, gout, rheumatism.

134. Lonicera Diervilla. *Diervillæ stipites.* Ross.
Taste and smell nauseous; effects antivenereal.

135. Lopeziana. *Radix.* Van M.
Syphilis.

136. Loranthus Europæus. *Viscum quercinum, lignum.* Aust. prov.
Smell nauseous; taste astringent, mucilaginous; effects tonic.

137. Lupinus Albus. *Farina.* Gen.
Farinaceous; bitter.

138. Lycoperdon Bovista. Ross.
No taste or smell; effects mechanical, suppression of hæmorrhagy.

139. Lycopodium Clavatum. *Lycopodii semen.* Ross. Brem. Bor. La G.
No taste or smell; effects absorbent.

140. Lythrum Salicaria. *Lysimachia purpurea. Herba.* Brem. *Salicaria.* Aust. prov.
No smell; taste sub-astringent; effects astringent, tonic.

141. Lytta Vittata. Coxe.
Epispastic.

142. Malva Rotundifolia. *Folia et flores.* Gen.
Demulcent.

143. Manganesium. *Manganesium oxidatum nativum.* Bor. *Magnesia nigra.* Ross. *Magnesia vitrariorum.* Aust. prov.
Used for the production of oxygen gas, oxymuriatic acid, and some other chemical preparations.

144. Maranta Galanga. *Galangæ radix.* Ross. Aust. prov. Brem. Bor. Van. M. La G.

Smell fragrant; taste aromatic, pungent, biting; effects stomachic, heating.

145. Maranta Arundinacea. *Radix.* Coxe.

Amylaceous, nutritive.

146. Matricaria Chamomilla. V. Mons. *Chamomillæ vulgaris flores, herba.* Ross. Aust. prov. *et* cast. Brem. Bor. Mar.

Smell strong; taste bitter, warmish; effects stomachic, discutient; substitute for chamomile.

147. Matricaria Parthenium. *Matricaria. Flos, herba.* Aust. prov. Bor. Van M. La G.

Smell nauseous; taste bitter; effects stomachic.

148. Medeola Virginiana. *Radix.* Coxe.

Diuretic; dropsies.

149. Melia Azedarach. *Radicis cortex.* Coxe.

Anthelmintic; lumbrici, tænia, tinea capitis.

150. Melissa Calamintha. *Folia.* La G.

Anti-hysteric.

151. Meloe Proscarabæus. Aust. prov. *Meloë majalis.* Brem. *Vermis majalis.* Ross. Bor.

No smell; taste acrid; effects stimulating, diuretic, caustic.

152. Mentha Crispa. *Herba.* Ross. Aust. prov. Brem. Gen. Mar. Van M.

Smell fragrant, strong; taste warm, aromatic; slightly bitter; effects resolvent, stomachic, carminative.

153. Mentha Aquatica. *Mentha rubra. Oleum distillatum.* Aust. cast.

Similar to the former.

154. Mercurialis Annua. *Herba.* Van M. La G.

Purgative.

155. Mimosa Senegal. *Arabicum gummi.* Brem.

Supposed to produce the finest gum-arabic.

156. Myrobalanus Citrina. *Cortex fructuum. Terminaliæ species?* Aust. prov.

Taste astringent; effects astringent.

157. Narcissus Pseudo-narcissus. *Flores.* Van M.

Fragrant; antispasmodic.

158. Nigella Sativa. *Nigella. Semen.* Brem. La G.

Smell fragrant; taste acrid, aromatic; effects stimulating, errhine, sialogogue, anthelmintic.

159. Nymphæa Lutea. *Radix.* La G.

Demulcent.

160. Ocimum Basilicum. Van M. *Basilici herba.* Bor.

Smell fragrant; expectorant.

161. ONONIS SPINOSA. *Ononis radix.* Aust. prov. Mar.
No smell; taste sweetish; effects diuretic.

162. ONOPORDIUM ACANTHIUM. *Cardui tomentosi herba recens.* Ross.
No smell; taste bitterish; effects specific, the cure of cancerous affections.

163. ORCHIS MASCULA, MORIO, MILITARIS, MACULATA, PYRAMIDALIS, et LATIFOLIA. *Salep. Satyrium. Radix.* Ross. Aust. prov. *et* cast. Brem. Bor. Van. M.
Taste amylaceous; effects nutritious.

164. ORIGANUM DICTAMNUS. *Dictamnus creticus. Herba.* Brem.
Smell slight, aromatic; taste aromatic; effects stimulant.

165. OROBANCHE VIRGINIANA. *Radix.* Coxe.
Nauseous bitter, astringent; dysentery, obstinate ulcers, cancer.

166. ORYZA SATIVA. *Oryzæ semen decorticatum.* Ross. Van M.
Taste farinaceous; effects nutritious, astringent.

167. PÆONIA OFFICINALIS. *Pæoniæ radix.* Ross. Brem. Bor. La G.
Smell unpleasant; taste at first sweetish, then disagreeably bitter; effects antispasmodic.

168. PHELLANDRIUM AQUATICUM. *Semen.* Ross. *Fœniculum. aquaticum.* Brem. Bor.
Smell heavy; taste aromatic, acrid; effects stimulating, resolvent.

169. PHŒNIX DACTYLIFERA. *Fructus.* Van M. La G.
Demulcent.

170. PHOSPHORUS. Coxe.
Tonic; poisonous; burning.

171. PHYSALIS ALKEKENGI. *Bacca.* Van M. La G.
Diuretic.

172. PHYTOLACCA DECANDRA. *Phytolaccæ herba recens, radix.* Ross.
No smell; taste acrid, corrosive; effects corrosive in cancer.

173. PIMPINELLA SAXIFRAGA. *Pimpinellæ albæ radix.* Ross. Aust. prov. Brem. Bor. La G.
Smell fragrant; taste warm, acrid; effects stomachic, diaphoretic, diuretic.

174. PINUS PINEA. *Pinus sativa. Nuclei.* Aust. prov.
Taste sweet, bland; effects nutritious.

175. PISTACIA VERA. *Fructus.* La G.
Nourishing; analeptic.

176. PLANTAGO MEDIA. *Plantago. Herba.* Aust. prov.
Taste sub-astringent; effects astringent.

177. PLANTAGO PSYLLIUM et CYNOPS. *Pysillii semen.* Ross. Bor.
Taste nauseous, mucilaginous, then acrid; effects relaxant.

178. PODOPHYLLUM PELTATUM. *Radix.* Coxe.

Purgative, anthelmintic; dose 20 grains; leaves poisonous; fruit esculent.

179. Polygala Amara. *Herba, radix.* Ross. Brem. Gen. Bor. Van M.

No smell; taste bitter, acidulous, mucilaginous; effects demulcent, roborant.

180. Polygala Vulgaris. *Polygala. Radix.* Aust. prov. Mar.

Taste sweetish, bitter; effects tonic, expectorant; substitute for seneka.

181. Polypodium Vulgare. *Polypodii radix.* Ross. Aust. prov. Brem. Bor.

Taste at first sweet, then nauseous, bitter, and astringent; effects demulcent, resolvent.

182. Populus Balsamifera. *Tacamahaca. Gummi-resina.* Ross. Van M.

Smell fragrant; taste nauseous, bitterish; effects stimulant, tonic.

183. Populus Nigra. *Gemmæ.* Van M.

Emollient; soporiferous.

184. Populus Tremula. *Cortex.* Coxe.

Tonic, stomachic; intermittents.

185. Prinos Verticillatus. *Cortex.* Coxe.

Astringent, bitter, pungent; tonic, intermittents.

186. Prunus Cerasus. *Cerasorum rubrorum acidorum fructus.* Ross. Brem. Bor.

Taste acidulous, sweetish; effects refrigerating, antiseptic.

Cerasorum nigrorum aqua. Aust. prov.

Narcotic.

187. Prunus Lauro-cerasus. *Lauro-cerasi folia.* Ross. Brem. Bor.

Smell fragrant; taste bitter, like that of bitter almonds; effects highly deleterious, narcotic, resolvent, diuretic.

188. Prunus Virginiana. *Cortex.* Coxe.

Bitter, astringent, aromatic, narcotic; tonic, anthelmintic.

189. Pteris Aquilina. *Filicis fœminæ radix.* Ross.

Smell nauseous; taste viscid, bitterish; effects anthelmintic.

190. Pulmonaria Officinalis. *Folia.* La G.

Anthiphthysical.

191. Pyrola Umbellata. *Folia.* Coxe.

Astringent, stimulant, epispastic; tonic; diuretic.

192. Pyrus Malus. *Poma acidula.* Bor. Van M.

Acidulous.

193. Rana Esculenta. La G.

Nutritious.

194. Ranunculus Sceleratus. *Herba.* Coxe.

Acrid; epispastic.

195. Rhamnus Zizyphus. *Fructus.* Van M.
Lubricant; expectorant.

196. Rheum Rhaponticum. *Radix.* La G.
Astringent

197. Rhodendron Maximum. *Folia.* Coxe.
Poisonous; chronic rheumatism.

198. Rubus Articus, *Baccæ.* Ross. La G.
Smell fragrant; taste acidulous, vinous; effects refrigerant; antiscorbutic. Similar properties are possessed by the fruits of the *rubus idæus, cæsius, fructicosus, chamæmorus.*

199. Rumex Acutus. *Lapathum acutum. Radix.* Aust. prov. Brem. Bor. Mar. Van M. La G.
Taste bitterish, acidulous; effects astringent.

200. Sagus Farinaria. *Medulla.* Van M.
Nutritious.

201. Salvia Horminum. *Folia.* La G.
Astringent, tonic.

202. Sambucus Ebulus. *Ebulus. Radix.* Aust. prov.
Smell fetid; taste nauseous, bitter, acrid; effects drastic, cathartic, emetic, narcotic.

203. Sanguinaria Canadensis. *Semen, radix, succus expressus* Coxe.
Emetic, purgative, expectorant, narcotic, acrid, tonic.

204. Sanicula Europæa. *Folia.* La G.
Harsh, herbaceous taste.

205. Saponaria Officinalis. *Saponariæ radix.* Ross. Aust. prov. *et* cast. Brem. Bor. Mar. Van M. La G.
No smell; taste slightly sweet, bitter, and glutinous; effects detergent.

206. Scabiosa Succisa. *Radix.* La G.
Alexipharmic.

207. Scabiosa Arvensis. *Scabiosa. Folium.* Aust. prov. Van M.
Taste slightly bitter; effects expectorant, vulnerary.

208. Scandix Cerefolium. *Cerefolii herba, succus.* Brem. Aust. prov.
Smell weak, balsamic; taste aromatic, balsamic; effects aperient, pectoral, diuretic.

209. Scorzonera Hispanica. *Scorzonera. Radix.* Aust. prov. Bor.
Taste sweetish; effects aperient, demulcent.

210. Secale Cereale. *Secalis farina.* Aust. prov. Gen. Van M.
Taste farinaceous; effects nutritious.

211. Sempervivum Tectorum. *Sedi majoris folia virentia,* Ross. Aust. prov. Brem.

Smell weak; taste sub-acrid, slightly styptic; effects refrigerant, astringent.

212. Senecio Jacobæa. *Herba.* Van M.
Anthelmintic.

213. Sepia Octopoda. *Sepiæ os.* Brem.
A carbonate of lime agglutinated by animal gluten.

214. Silene Virginica. *Radix.* Coxe.
Anthelmintic.

215. Sium Sisarum. *Ginseng.* *Radix.*
Bitter sweet, tonic.

216. Smilax China. *Chinæ radix.* Aust. prov. Brem.
No smell; taste mucilaginous; effects sudorific, antivenereal.

217. Solanum Nigrum. *Herba.* Bor. Van M. Mar.
Smell nauseous; effects diuretic, narcotic.

218. Spigelia Anthelmia. *Herba cum radice.* Ross. Brem.
Taste and smell fetid; effects narcotic, purgative, anthelmintic.

219. Spiræa Trifoliata. *Radix.* Coxe.
Emetic.

220. Strychnos nux Vomica. *Nux vomica.* Bor. Van. M. La G.

No smell; taste intensely bitter; effects tonic, narcotic, deleterious.

221. Symphitum Officinale. Van M. La G. *Symphiti radix.* Ross. *Consolida major.* Aust. prov. Brem.
No smell; taste mucilaginous; effects emollient, inspissant.

222. Testudo Ferox, &c. La G.
Nutritious.

223. Teucrium Chamæpitys. *Chamæpityos herba.* Ross.
Smell fragrant; taste bitter and aromatic; effects tonic.

224. Theobroma Cacao. Van M. La G. *Cacao.* *Nucleus.* *Oleum.* Ross. Aust. prov. Brem. Bor.
Little smell; taste pleasant and oily, very slightly astringent and bitterish; effects nutritious. Oil bland, sweetish; effects emollient, lubricating.

225. Thymus Serpyllum. *Serpylli herba.* Ross. Aust. prov. Brem. Bor. La G.
Smell fragrant; taste aromatic, bitterish; effects stimulant, diuretic, emmenagogue.

226. Thymus Vulgaris. *Thymi herba.* Ross. Brem. La G.
Smell fragrant; taste warm, pungent, bitter; effects stimulant, diuretic, emmenagogue.

227. Tilia Europæa. *Flores.* Van M. La G.
Fragrant; anodyne.

228. Trifolium Melilotus Officinalis. *Meliloti herba cum floribus.* Ross. Aust. prov. Brem. Bor. Van M.
Smell fragrant; taste herbaceous, bitterish; effects discutient.

229. TRIOSTEUM PERFOLIATUM. *Radicis cortex.* Coxe.
Diuretic, carthartic, emetic.

230. TRITICUM REPENS. Van M. La G. *Graminis radix.* Ross. Aust. prov. *et* cast. Brem. Gen. Bor.
Smell herbaceous; taste sweetish; effects aperient, demulcent.

231. ULMUS AMERICANA. *Cortex.* Coxe.
Esculent, emollient.

232. VACCINIUM MYRTILLUS. *Myrtilli baccæ.* Ross. Aust. prov.
No smell; taste acidulous, sub-astringent; effects refrigerant, astringent.

233. VACCINIUM OXYCOCCOS. *Oxycocci baccæ.* Ross.
Taste acidulous; effects refrigerant.

234. VACCINIUM VITIS IDÆA. *Vitis idææ baccæ, folia.*
Taste acidulous; effects refrigerant, antiseptic.

235. VERATRUM SABADILLA. Van M. *Sabadillæ semen.* Ross. Aust. prov. *et* cast. Brem. Bor. Mar. La G.
Taste very bitter, acrid, and caustic; effects stimulant, drastic, carthartic, anthelmintic, errhine.

236. VERATRUM LUTEUM. *Radix.* Coxe.
Pungent, narcotic, bitter; tonic, anthelmintic.

237. VERBASCUM THAPSUS. Van M La G. *Verbasci flores, folia.* Ross. Aust. prov. Brem. Bor. Mar.
Taste of the leaves herbaceous, bitterish; effects emollient, discutient; smell of the flowers sweet; taste sweet; effects pectoral.

238. VERBENA OFFICINALIS. *Folia.* La G.
Vulnerary.

239. VERONICA OFFICINALIS. *Folia.* Van M. La G.
Vulnerary; pectoral.

240. VICIA FABA. *Faba. Semen.* Aust. prov.
Taste farinaceous; effects nutritious.

241. VIOLA TRICOLOR. *Herba.* Ross. Aust. prov. *Jacea Herba.* Brem. Bor. Mar. Van M.
Smell agreeable; taste mucilaginous, bitterish; effects anodyne.

242. VISCUM ALBUM. Bor. La G.
Glutinous; speicfic; anti-paralytic; anti-epileptic.

243. VITIS VINIFERA APYRENA. *Passulæ minores.* Ross. Brem.
Taste sweet, acidulous; effects refrigerant, demulcent, lubricating.

244. ZANTHORHIZA APIIFOLIA. *Radix.* Coxe.
Bitter; tonic.

245. ZANTHOXYLUM CLAVA HERCULIS. *Cortex.* Coxe.
Stimulant, sialogogue; rhematism, toothach.

No. II.

List of Animals which furnish Articles of the Materia Medica, arranged according to Cuvier's System.

MAMMALIA.

RODENTIA.	Castor fiber.
PACHYDERMATA.	Sus scrofa.
RUMINANTIA.	Moschus moschiferus.
	Cervus elaphus
	Ovis aries.
	Bos taurus.
CETACEA.	Physeter macrocephalus.

AVES.

GALLINÆ.	Phasianus gallus.
ANSERES.	Anas anser.

PISCES.

CHONDROPTERGYGII.	Acipenser sturio, stellatus, huso, ruthenus.

CRUSTACEA.

CANCERES.	Cancer pagurus, astacus.

INSECTA

COLEOPTERA.	Lytta vessicatoria. *(Meloe vesicatorius.)*
	Meloe proscarabæus.
HYMENOPTERA.	Cyneps querci folii.
	Apis mellifera.
	Formica rufa.
HEMIPTERA.	Coccus cacti.
GNATHAPTERA.	Oniscus asellus.

MOLUSCA.

CEPHALOPODA.	Sepia Officinalis.
ACEPHALA.	Ostrea edulis.

VERMES.

	Hirudo medicinalis.

ZOOPHYTA.

CERATOPHYTA.	Gorgonia nobilis. *(Isis nobilis.)*
SPONGIA.	Spongia officinalis.

No. III.

List of the Genera of Medicinal Plants, arranged according to the Linnæan System.

Cl. I. MONANDRIA.

Ord. Monogynia. Kæmpferia.
Curcuma.
Amomum.
Costus.
Maranta.
Lopezia.

Cl. II. DIANDRIA.

Ord. Monogynia. Olea.
Veronica.
Gratiola.
Verbena.
Rosmarinus.
Salvia.
Ord. Trigynia. Piper.

Cl. III. TRIANDRIA

Ord. Monogynia. Valeriana.
Crocus.
Iris.
Ord. Digynia. Saccharum.
Avena.
Secale.
Triticum.
Hordeum.

Cl. IV. TETRANDRIA.

Ord. Monogynia. Scabiosa.
Plantago.
Penæa.
Rubia.
Fagara.
Santalum.
Alchemilla.
Dorstenia.
Ord. Digynia. Cuscuta.

Cl. V. PENTANDRIA.

Ord. Monogynia. Pulmonaria.
Symphitum.
Borago.
Cynoglossum.
Anagallis.
Anchusa.
Spigelia.
Menyanthes.
Ord. Monogynia. Convolvulus.
Datura.
Hyosciamus.
Nicotiana.
Verbascum.
Chironia.
Cordia.
Strychnos.
Capsicum.
Solanum.
Physalis.
Atropa.
Cinchona.
Lobelia.
Psychotria.
Cephaëlis.
Lonicera.
Rhamnus.
Vitis.
Viola.
Ribes.
Hedera.
Ord. Digynia. Gentiana.
Chenopodium.
Ulmus.
Eryngium.
Sanicula.
Daucus.
Conium.
Sium.
Cuminum.
Ferula.
Bubon.
Angelica.
Coriandrum.
Phellandrium.
Imperatoria.
Cicuta.
Carum.
Pastinaca.
Anethum.
Apium.
Pimpinella.
Ord. Trigynia. Sambucus.
Rhus.
Ord. Pentagynia. Linum.

Cl. VI. HEXANDRIA.

Ord. MONOGYNIA.	Loranthus.
	Berberis.
	Narcissus.
	Allium.
	Aloë.
	Convallaria.
	Dracæna.
	Scilla.
	Asparagus.
	Lilium.
	Acorus.
	Calamus.
Ord. DIGYNIA.	Oryza.
Ord. TRIGYNIA.	Colchicum.
	Rumex.

Cl. VII. HEPTANDRIA.

Ord. MONOGYNIA.	Æsculus.

Cl. VIII. OCTANDRIA.

Ord. MONOGYNIA.	Amyris.
	Vaccinium.
	Daphne.
Ord. TRIGYNIA.	Coccoloba.
	Polygonum.

Cl. IX. ENNEANDRIA.

Ord. MONOGYNIA.	Laurus.
Ord. TRIGYNIA.	Rheum.

Cl. X. DECANDRIA.

Ord. MONOGYNIA.	Myroxylon.
	Toluifera.
	Cassia.
	Guilandina.
	Dictamnus.
	Hæmatoxylon.
	Swietenia.
	Guajacum.
	Ruta.
	Quassia.
	Ledum.
	Rhododendron.
	Arbutus.
	Styrax.
	Copaifera.
Ord. DIGYNIA.	Saponaria.
	Dianthus.
Ord. PENTAGYNIA.	Oxalis.
Ord. DECAGYNIA.	Phytolacca.

Cl. XI. DODECANDRIA.

Ord. MONOGYNIA.	Asarum.
	Garcinia.
	Canella.
	Portulaca.
	Lythrum.
Ord. DIGYNIA.	Agrimonia.
Ord. TRIGYNIA.	Euphorbia.

Cl. XII. ICOSANDRIA.

Ord. MONOGYINA.	Cactus.
	Eugenia.
	Myrtus.
	Punica.
	Eucalyptus.
	Amygdalus.
	Prunus.
Ord. PENTAGYNIA.	Pyrus.
Ord. POLYGYNIA.	Rosa.
	Rubus.
	Tormentilla
	Fragaria.
	Potentilla.
	Geum.

Cl. XIII. POLYANDRIA.

Ord. MONOGYNIA.	Papaver.
	Chelidonium
	Cistus.
	Tilea.
	Nymphæa,
Ord. DIGYNIA.	Pæonia.
Ord. TRIGYNIA.	Delphinium.
	Aconitum.
Ord. TETRAGYNIA.	Wintera.
Ord. PENTAGYNIA.	Nigella.
Ord. POLYGYNIA.	Clematis.
	Helleborus.

Cl. XIV. DIDYNAMIA.

Ord. GYMNOSPERMIA.	Glecoma.
	Hyssopus.
	Mentha.
	Lavandula,
	Teucrium.
	Lamium.
	Satureja.
	Marrubium
	Thymus.
	Ocimum.
	Origanum.
	Melissa.

Ord. Angiospermia. Euphrasia.
Scrophularia.
Digitalis.

Cl. XV. TETRADYNAMIA.

Ord. Siliculosæ. Cochlearia.
Lepidium.
Raphanus.
Cardamine.
Sinapis.
Sisymbrium.

Cl. XVI. MONADELPHIA.

Ord. Triandria. Tamarindus.
Ord. Polyandria. Malva.
Althæa.

Cl. XVII. DIADELPHIA.

Ord. Hexandria. Fumaria.
Ord. Octandria. Polygala.
Ord. Decandria. Pterocarpus.
Spartium.
Genista.
Lupinus.
Dolichos.
Astragalus.
Trifolium.
Glycyrrhiza.
Geoffroya.
Trigonella.

Cl. XVIII. POLYADELPHIA.

Ord. Decandria. Theobrama.
Ord. Icosandria. Citrus.
Ord. Polyandria. Melaleuca.
Hypericum.

Cl. XIX. SYNGENESIA.

Ord. Polygamia æqualis.
Cichoreum.
Scorzonera.
Leontodon.
Lactuca.
Carlina.
Arctium.
Carthamus.
Cynara.
Carduus.
Ord. Polygamia superflua.
Artemisia.
Tanacetum.
Bellis.
Matricaria.
Arnica.
Ord. Polygamia superflua.
Inula.
Solidago.
Senecio.
Tussilago.
Anthemis.
Achillea.
Ord. Polygamia frustranea.
Centaurea.
Ord. Polygamia necessaria.
Calendula.

Cl. XIX. GYNANDRIA.

Ord. Diandria. Orchis.
Epidendrum.
Ord. Hexandria. Aristolochia.
Ord. Dodecandria. Cytinus.
Ord. Polyandria. Arum.

Cl. XXI. MONOECIA.

Ord. Tetrandria. Betula.
Morus.
Urtica.
Ord. Polyandria. Quercus.
Juglans.
Liquidamber.
Ord. Monadelphia. Pinus.
Ricinus.
Croton.
Ord. Syngenesia. Momordica;
Cucumis.
Cucurbita.
Bryonia.

Cl. XXII. DIOECIA.

Ord. Diandria. Salix.
Ord. Tetrandria. Viscum.
Ord. Pentandria. Pistacia.
Cannabis.
Humulus.
Ord. Hexandria. Smilax.
Ord. Octandria. Populus.
Ord. Monadelphia. Juniperus.
Cissampelos.

Cl. XXIII. POLYGAMIA.

Ord. Monoecia. Veratum.
Mimosa.
Parietaria.
Ord. Dioecia. Fraxinus:
Panax.
Ord. Trioecia. Ficus.
Ceratonia.

Cl. XXIV. CRYPTOGAMIA.

Ord. Filices. Polypodium.
Adiantum.
Ord. Musci. Lycopodium.
Ord. Algæ. Lichen.
Conferva.
Ord. Fungi. Agaricus.
Boletus.
Lycoperdon.

Cl. XXV. PALMÆ.

Cocos.
Phœnix.
Sagus.

List of Officinal Genera, arranged according to the Natural System of Jussieu, improved by Ventenat.

Cl. I. ACOTYLEDONES.

Ord. 1. Fungi. Lycoperdon.
Boletus.
Agaricus.
2. Algæ. Conferva.
Lichen.
Plataphyllum.
3. Hepaticæ.
4. Musci. Lycopodium.
5. Filices. Polypodium.
Pteris.
Adiantum.
Cycas.

MONOCOTYLEDONES.

Cl. II. STAMINA HYPOGYNIA.

Ord. 1. Pluviales.
2. Aroideæ. Arum.
Acorus.
3. Typhoideæ.
4. Cyperoideæ.
5. Gramineæ. Saccharum.
Lolium.
Hordeum.
Triticum.
Secale.
Avena.
Oryza.

Cl. III. PERIGYNIA.

Ord. 1. Palmæ. Calamus.
Areca.
Cocos.
Sagus.
Phœnix.
Ord. 2. Asparagoideæ.
Dracæna.
Asparagus.
Convallaria.
3. Smilaceæ. Smilax.
4. Ioncaceæ. Veratrum.
Colchicum.
5. Alismoideæ.
6. Lilaceæ.
a. Asphodeloideæ.
Scilla.
Allium.
b. Gloriosæ.
Lilium.
c. Aloideæ.
Aloë.
7. Narcissoideæ.
Narcissus.
8. Irideæ. Iris.
Crocus.

Cl. IV. EPIGYNIA.

Ord. 1. Scitamineæ.
2. Drymyrhizæ.
Amomum.
Kæmpferia.
3. Orchideæ. Orchis.
Vanilla.
4. Hydrocharideæ.

DICOTYLEDONES.

FLORES APETALI.

Cl. V. EPIGYNIA.

Ord. 1. Asaroideæ.
Aristolochia.
Asarum.
Cytinus.

Cl. VI. PERIGYNIA.

Ord. 1. Elæagnoideæ.
2. Daphnoideæ. Daphne.
3. Proteoideæ.
4. Laurineæ. Laurus.
Myristica.
5. Polygoneæ. Coccoloba.
Polygonum.
Rumex.
Rheum.
6. Chenopodeæ.
Phytolacca.
Chenopodium.

Cl. VII. HYPOGYNIA.

Ord. 1. Amaranthoideæ.
2. Plantagineæ.
Plantago.
Psyllium.
3. Nyctagineæ. Mirabilis.
4. Plumbagineæ.

B. MONOPETALI.

Cl. VIII. HYPOGYNIA.

Ord. 1. Primulaceæ.
2. Orobanchoideæ.
3. Rhinanthoideæ.
Polygala.
Veronica.
4. Acanthoideæ.
5. Lilaceæ. Fraxinus.
6. Iasmineæ. Olea.
7. Pyrenaceæ.
8. Labiatæ. Rosmarinus.
Salvia.
Teucrium.
Hyssopus.
Lavandula.
Mentha.
Glecoma.
Marrubium.
Origanum.
Thymus.
Melissa.
Ocimum.
9. Personatæ. Digitalis.
Gratiola.
10. Solaneæ. Hyosciamus.
Nicotiana.
Datura.
Atropa.
Solanum.
Capsicum.
Ord. 11. Sebestenæ. Cordia.
12. Borragineæ. Anchusa.
13. Convolvulaceæ.
Convolvulus.
14. Polymonaceæ.
15. Bignoneæ.
16. Gentianeæ.
Menyanthes.
Gentiana.
Chironia.
Spigelia.
17. Apocineæ. Asclepias.
18. Hilospermæ.

Cl. IX. PERIGYNIA.

Ord. 1. Ebenaceæ. Styrax.
2. Rhodoraceæ.
Rhododendron.
Ledum.
3. Bicornes. Arbutus.
Vaccinium.
4. Campanulaceæ.
Lobelia.

Cl. X. EPIGYNIA, WITH UNITED ANTHERÆ.

Ord. 1. Cichoraceæ. Lactuca.
Taraxacum.
Cichorium.
Scolymus.
2. Cinarocephalæ.
Cinara.
Arctium.
Centaurea.
3. Corymbiferæ.
Anthemis.
Achillea.
Solidago.
Inula.
Tussilago.
Arnica.
Matricaria.
Tanacetum.
Artemisia.
Absinthium.

Cl. XI. EPIGYNIA, WITH DISTINCT ANTHERÆ.

Ord. 1. Dipsaceæ. Valeriana.
2. Rubiaceæ. Galium.
Rubia.
Cinchona.
Psychotria.

Coffea.
3. Caprifoliaceæ.
Diervilla.
Sambucus.
Cornus.
Hedera.

C. POLYPETALI.
Cl. XII. EPIGYNIA.

Ord. 1. Araliaceæ. Panax.
2. Umbelliferæ.
Pimpinella.
Carum.
Apium.
Anethum.
Pastinaca.
Imperatoria.
Scandix.
Coriandrum.
Phellandrium.
Cuminum.
Bubon.
Sium.
Angelica.
Ligusticum.
Ferula.
Cicuta.
Daucus.
Eryngium.

Cl. XIII. HYPOGYNIA.

Ord. 1. Ranunculaceæ.
Clematis.
Helleborus.
Delphinium.
Aconitum.
2. Tulipiferæ. Illicium.
3. Glyptospermæ.
4. Menispermoideæ.
5. Berberideæ. Berberis.
6. Papaveraceæ.
Papaver.
Chelidonium.
Fumaria.
7. Crucifreæ. Raphanus.
Sinapis.
Sisymbrium.
Cardamine.
Cochlearia.
Nasturtium.
8. Capparideæ.
9. Saponaceæ.
Ord. 10. Malpighiaceæ.
Hippocastanum.
11. Hypericoideæ.
Hypericum.
12. Guttiferæ.
Mangostana.
13. Hesperideæ. Citrus.
14. Meliaceæ. Canella.
Swietenia.
15. Sarmentaceæ. Vitis.
16. Geranioideæ. Oxalis.
17. Malvaceæ. Malva.
Althæa.
Hibiscus.
Theobroma.
18. Tiliaceæ. Tilia.
19. Cistoideæ. Cistus.
Viola.
20. Rutaceæ. Guaiacum.
Ruta.
Dictamnus.
21. Carophylleæ.
Dianthus.
Linum.

Cl. XIV. PERIGYNIA.

Ord. 1. Portulaceæ.
2. Ficoideæ.
3. Succulentæ. Sedum.
4. Saxifrageæ. Ribes.
5. Cactoideæ. Cactus.
6. Melastomeæ.
7. Calycanthiemæ.
8. Epilobianæ.
9. Myrtoideæ.
Eucalyptus.
Melaleuca.
Myrtus.
Eugenia.
Caryophyllus.
Punica.
10. Rosaceæ. Malus.
Pyrus.
Cydonia.
Rosa.
Alchemilla.
Tormentilla.
Potentilla.
Geum.
Rubus.
Cerasus.
Prunus.

Ord. 10. ROSACEÆ.
Amygdalus.
11. LIGUMINOSÆ.
Mimosa.
Tamarindus.
Cassia.
Moringa.
Hæmatoxylum.
Spartium.
Genista.
Trigonella.
Lupinus.
Melilotus.
Dolichos.
Astragalus.
Glycyrrhiza.
Dalbergia.
Geoffræa.
Pterocarpus.
Copaifera.
12. TEREBINTACEÆ.
Rhus.
Amyris.
Terebinthus.
Bursera.
Toluifera.
Fagara.
Juglans.
13. RHAMNOIDEÆ.
Rhamnus.

D. APETALI. Cl. XV. IDIOGYNIA.
Ord. 1. TITHYMALOIDEÆ.
Euphorbia.
Clutia.
Ricinus.
Croton.
2. CUCURBITACEÆ.
Bryonia.
Elaterium.
Momordica.
Cucumis.
Cucurbita.
3. URTICEÆ. Ficus.
Dorstenia.
Urtica.
Parietaria.
Humulus.
Piper.
Morus.
4. AMENTACEÆ. Ulmus.
Salix.
Populus.
Beutla.
Quercus.
Liquid amber.
5. CONIFERÆ. Juniperus.
Abies.
Pinus.

No. IV.

List of Substances belonging to the MINERAL KINGDOM, *which are used in Medicine.*

EARTHS.

LIME.

Carbonate of Lime.
  a. Chalk.
  b. Marble.

BARYTA.

Carbonate of baryta.
Sulphate of baryta.

ALUMINA.

Bole.

SALTS.

Sulphate of magnesia.
Super-sulphate of alumina and potass.
Sulphate of iron.
  of copper.
  of zinc.
Sub-borate of soda.
Nitrate of potass.
Muriate of soda.

INFLAMMABLES.

Naphtha.
Bitumen.
Amber.
Sulphur.

METALS.

Silver.
Copper.
Iron.
Tin.
Lead.
Mercury.
Zinc.
Antimony.
Arsenic.
Bismuth.

PART III.

PREPARATIONS AND COMPOSITIONS.

CHAP. I.—SULPHUR.

SULPHUR SUBLIMATUM LOTUM. *Edin.*

Washed Sublimed Sulphur.

Take
  Sublimed sulphur, one pound;
  Water, four pounds.

Boil the sulphur for a little in the water, then pour off this water, and wash away all the acid by affusions of cold water: and, lastly, dry the sulphur.

SULPHUR LOTUM. *Lond.*

Washed Sulphur.

Take of
  Sublimed sulphur, a pound.

Pour on boiling water, so that the acid, if there be any, may be entirely washed away.

SULPHUR SUBLIMATUM LOTUM. *Dub.*

Washed Sublimed Sulphur.

Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water, when poured off, is impregnated with acid, which is known by means of lithmus. Dry the sulphur on bibulous paper.

As it is impossible to sublime sulphur in vessels perfectly void of air, a small portion of it is always acidified and converted into sulphurous or sulphuric acid. The presence of acid in sulphur is always to be considered as an impurity, and must be removed by careful ablution. It is directed to be kept in closed vessels, and Dr. Powel says, that in an open drawer, its superior surface becomes manifestly acid; but when thoroughly washed, sublimed sulphur is not acted upon by the atmosphere, there is therefore no particular reason for preserving it from the action of the air; for if, on keeping, it become moist, it is because the sulphuric acid has not been entirely washed away.

SULPHUR PRÆCIPITATUM. *Lond.*

Precipitated Sulphur.

Take of
  Sublimed sulphur, one pound;
  Fresh lime, three pounds.
Boil the sulphur and lime together in water, then filter the liquor through paper, and drop into it as much muriatic acid as is necessary to precipitate the sulphur. Lastly, wash this, by repeatedly pouring water upon it till it becomes insipid.

THIS process is a considerable improvement upon that in the preceding Pharmacopœia. A solution of sulphuret of lime is first prepared; it is then decomposed by muriatic acid, which unites with the lime, expels sulphuretted hydrogen gas, and precipitates the sulphur, which is easily purified by ablution from the very soluble muriate of lime.

Precipitated sulphur, though much more expensive, does not differ, in its medical properties, from well washed sublimed sulphur. Its paler colour is owing to its more minute division, or, according to Dr. Thomson, to the presence of a little water; but from either circumstance it derives no superiority to compensate for the trouble and disagreeableness of its preparation, unless its whiter colour be considered as an advantage in the preparation of ointments.

SULPHURETUM POTASSÆ. *Edin.*

Sulphuret of Potass.

Take of
  Carbonate of potass,
  Sublimed sulphur, each eight ounces.
Triturate them well together, put them into a large coated crucible, fit a cover to it, and having applied live coals cautiously around it, bring them at length to a state of fusion.
Break the crucible as soon as it has grown cold, take out the sulphuret, and keep it in a well-closed phial

Lond.

Take of
  Washed sulphur, one ounce;
  Sub-carbonate of potass, five ounces.
Triturate them together, and place them in a covered crucible over the fire until they unite.

SULPHURETUM KALI. *Dub.*

Sulphuret of Kali.

Take of
Sub-carbonate of kali,
Sublimed sulphur, each two ounces.
Mix and put them into a crucible. Fit a cover to it, and expose them to a heat, gradually increased, until they unite.

There exists a very strong affinity between sulphur and potass, but they must be united in a state of perfect dryness; because, if any moisture be present, it is decomposed, and alters the nature of the product. If potass be employed, it will unite with the sulphur by simple trituration, and will render one third of its weight of sulphur soluble in water. If sub-carbonate of potass be used, as directed by the colleges, it is necessary to bring the sulphur into a state of fusion; it then acts upon the sub-carbonate, and expels the carbonic acid. It is evident, that to saturate the same quantity of sulphur, a larger proportion of carbonate of potass than of potass is necessary; but the quantity ordered by the London college is certainly much too large. Gottling directs only one part of carbonate of potass to two of sulphur: and to save the crucible, he directs the mixture, as soon as it melts, to be poured into a heated mould, anointed with oil. If the fusion be not very cautiously performed, the sudden extrication of so large a quantity of carbonic acid gas is apt to throw the melted matter out of the crucible, and may be attended with unpleasant consequences. La Grange projects one part of sulphur on one and a half of potass in fusion, and keeps the compound melted half an hour before he pours it out. If the heat be too great, and the crucible uncovered, the sulphureous vapour is apt to inflame; but it is easily extinguished by covering it up. For the preparation of precipitated sulphur, Hermbstadt proposes to obtain the sulphuret of potass, by heating together in a crucible four parts of sulphate of potass with one of charcoal powder. The charcoal is converted into carbonic acid gas, and the sulphate into sulphuret.

Sulphuret of potass, properly prepared, is of a liver-brown colour, and was hence formerly called *Hepar sulphuris.* It should be hard, brittle, and have a vitreous fracture. It has an acrid bitter taste, and the smell of sulphur. It is exceedingly prone to desomposition. It is deliquescent in the air, and is decomposed. It is very fusible, but a strong heat separates the sulphur by sublimation. The moment it comes in contact with water, there is a mutual decomposition. Part of the sulphur becomes acidified, deriving oxygen from the water, and forms sulphate of potass. Part of the hydrogen of the water decomposed, combines with another portion of the sulphur, and escapes in the form of sulphuretted hydrogen gas: another portion of the hydrogen combines with a third portion of the sulphur, and remains in solution, united with the alkali, in the state of hydroguretted sulphuret of potass. By acids, sulphuret of potass is immediately decomposed; the acid combines with the potass, sulphuretted hydrogen gas is expelled, and the sulphur is precipitated.

AQUA SULPHURETI KALI. *Dub.*
Water of Sulphuret of Kali.

Take of

Sublimed sulphur, half an ounce;

Water of caustic kali, nine ounces, by measure.

Boil for ten minutes, and strain through paper. Keep the liquor in phials well corked.

The specific gravity of this liquor is 1120.

The Dublin college have substituted for the sulphuret of potass, a preparation which is exactly similar to a solution of it in water. When sulphur is boiled in a solution of caustic alkali, a portion of the water is decomposed; the oxygen forms, with some of the sulphur and potass, sulphate of potass, and the hydrogen, with the remainder, hydro-sulphuret of potass. The former being difficultly soluble, is precipitated and separated by filtration. The solution must be well preserved from the action of the air, which gradually decomposes it, forming sulphate of potass.

Medical use.—Hydro-sulphuret of potass is an exceedingly nauseous remedy; but it is used internally as an antidote to metallic poisons, to check excessive salivations from mercury, and in cutaneous affections. Externally, it is used with success against tinea capitis, and in psora.

HYDRO-SULPHURETUM AMMONIÆ. *Ed.*
Hydro-Sulphuret of Ammonia.

Take of

Water of ammonia, four ounces;

Subject it, in a chemical apparatus, to a stream of the gas which arises from

Sulphuret of iron, four ounces,

Muriatic acid, eight ounces, previously diluted with two pounds and a half of water.

SULPHURET OF IRON is conveniently prepared for this purpose from

Purified filings of iron, three parts,

Sublimed sulphur, one part,

Mixed and exposed to a moderate degree of heat, in a covered crucible, until they unite into a mass.

SULPHURETUM FERRI. *Dub.*
Sulphuret of Iron.

Take of
- Filings of iron, six ounces;
- Sublimed sulphur, two ounces.

Mix and expose them in a covered crucible to a gentle heat until they unite.

HYDRO-SULPHURETUM AMMONIÆ. *Dub.*
Hydro-Sulphuret of Ammonia.

Take of
- Sulphuret of iron in coarse powder, four ounces;
- Muriatic acid, seven ounces, by measure;
- Water, two pints;
- Water of caustic ammonia, four ounces.

Put the sulphuret into a matrass, then gradually pour on the acid diluted with the water, and in a proper apparatus transmit the gas evolved, through the water of ammonia. Towards the end of the operation apply a gentle heat.

AQUA SULPHURETI AMMONIÆ. *Dub.*
Water of Sulphuret of Ammonia.

Take of
- Fresh burnt lime,
- Muriate of ammonia in powder, each four ounces;
- Sublimed sulphur,
- Warm water, each two ounces, by weight.

Sprinkle the water upon the lime, placed in an earthen vessel, and cover it up until the lime falls to powder, which, as soon as it is cold, is to be mixed by trituration with the sulphur and muriate of ammonia. Put the mixture into a retort, and distil with a sudden and sufficiently strong degree of heat. Keep the liquor thus obtained in a phial, accurately closed with a glass stopper.

SULPHURETTED hydrogen is capable of combining with different bases in the manner of an acid. In the present preparation, it is combined with ammonia. In the one process, it is obtained by decomposing sulphuret of iron by muriatic acid. As soon as the acid, by its superior affinity, separates the iron from the sulphur, the latter immediately re-acts on the water, the oxygen of which forms, with one portion of it, sulphuric acid, while the hydrogen dissolves another portion, and forms sulphuretted hydrogen gas. The combination of this with ammonia is facilitated by reduction of temperature, and by making it pass through a column of the water of ammonia, by means of an apparatus, such as Woulfe's, or Nooth's. Trommsdorff has proposed, that the sulphuretted hydrogen gas should be obtained by the decomposition of sulphuret of potass; but in this way its formation is too rapid to be easily managed. Gottling says, that the acid should be added gradually, and that the whole must be constantly agitated. But these precautions are rendered less necessary, by diluting the acid to the degree directed by the Pharmacopœia. Mr. Cruickshank, who first suggested the use of hydro-sulphuret of ammonia in medicine, directs the sulphuret of iron to be prepared by heating a bar of iron to a white heat in a smith's forge, and rubbing against the end of it a roll of sulphur. The iron, at this temperature, immediately combines with the sulphur, and forms globules of sulphuretted iron, which should be received in a vessel filled with water. It is, however, more conveniently obtained in the manner directed by the college. Proust has proved that iron is capable of combining with two proportions of sulphur. At a high temperature, 100 parts of iron combine with 60 of sulphur, and form a compound of a dull blackish colour. In this state, it is fit for the production of sulphuretted hydrogen gas. At a lower temperature, the same quantity of iron takes up 90 of sulphur, acquires a greenish yellow colour, and in every respect resembles native pyrites. This cannot be decomposed by acids, and is therefore unfit for the production of gas; but it may be reduced to the state of iron sulphuretted to the minimum, by exposing it to a sufficiently high temperature, or by melting it with half its weight of iron filings. It was probably from not attending to the different states of sulphuretted iron, that some of the German chemists failed in their attempts to procure from it sulphuretted hydrogen gas, and had recourse to sulphuret of potass.

The second process of the Dublin college is totally different. The ammonia and sulphuretted hydrogen are presented to each other in a nascent state, and with the undecomposed part of the water, pass over into the receiver, while, in the retort, the lime remains combined with sulphuric and muriatic acid.

The hydro-sulphuret of ammonia was formerly called the *fuming liquor of Boyle.* It is of a dark red colour, and is extremely fetid. It is decomposed by all acids, and almost all metallic solutions.

Medical use.—Hydro-sulphuret of ammonia, or, more correctly, sulphuretted hydroguret of ammonia, acts powerfully on the living system. It induces vertigo, drowsiness, nausea, and vomiting, and lessens the action of the heart and arteries. It therefore seems to be a direct sedative. According to the doctrine of the chemical physiologists, it is a powerful disoxygenizing remedy. It has only been used in diabetes, by Dr. Rollo and others, under the name of Hepatized ammonia, in doses of five or ten drops twice or thrice a-day.

CHAP. II.—ACIDS.

ACIDUM SULPHURICUM DILUTUM. *Ed.*

Diluted Sulphuric Acid.

Take of
  Sulphuric acid, one part;
  Water, seven parts.
Mix them.

Dub.

Take of
  Sulphuric acid, two ounces, by weight;
  Distilled water, fourteen ounces, by weight.
Having gradually mixed them, set the mixture aside to cool, and then pour off the clear liquor.
The specific gravity of this acid is 1090.

Lond.

Take of
  Sulphuric acid, one fluidounce and a half;
  Distilled water, fourteen fluidounces and a half.
Add the acid by degrees to the water, and mix.

THE most simple form in which sulphuric acid can be advantageously employed internally, is that in which it is merely diluted with water: and it is highly proper that there should be some fixed standard, in which the acid in this state should be kept. It is, however, much to be regretted, the same standard with respect to strength has not been uniformly adopted; and especially, that the London college should have deviated so very remarkably, both from their own former editions and from the other colleges. Dr. Powell, whose translation may be considered as official, states, in defence of the change, that the new mixture will be more conveniently made, and its dose more easily apportioned than that of the former Pharmacopœia. I do not see any ground for either of these arguments; and even if they were well founded, they would not compensate the inconveniences and accidents which must arise from changing the strength of a substance one half, and retaining nearly the same title. Dr Powell, it is also necessary to remark, has fallen into an important error in his calculations. He states that an ounce of sulphuric acid, by measure, is equal to 11 dr. 1 scr. by weight, whereas it is equal to 14. dr. and eight-tenths of a grain. In the Edinburgh and Dublin colleges, the strong acid constitutes an eighth, in the New London $\frac{1}{6.155}$, and in the former London, one ninth of the mixture. The first proportion seems preferable, as it gives a drachm of acid to the ounce. Their comparative strengths are nearly in the following proportions :

Late London, -	1000
Edinburgh and Dublin,	1125
New London, -	1445

Dr. Powell says, that one ounce of the last will saturate about 107 grains of dried sub-carbonate of soda. The dilution by means of distilled water is preferable to spring water ; which, even in its purest state, is not free from impregnations affecting the acid. Even when distilled water is used, there is often a small quantity of a white precipitate, arising from lead dissolved in the acid.

Sulphuric acid has a very strong attraction for water ; and their bulk, when combined, is less than that of the water and acid separately. At the same time, there is a very considerable increase of temperature produced, which is apt to crack glass vessels, unless the combination be very cautiously made ; and, for the same reason, the acid must be poured into the water, not the water into the acid. Sulphuric acid diluted with one third its weight of water, ceases to give out heat on the farther addition of water.

ACIDUM NITROSUM. *Ed.*

Nitrous Acid.

Take of
- Very pure nitrate of potass, two pounds ;
- Sulphuric acid, sixteen ounces.

Having put the nitrate of potass into a glass retort, pour upon it the sulphuric acid, and distil in a sand bath, with a heat gradually increased, until the iron pot begins to be red-hot.

The specific gravity of this acid is to that of distilled water as 1550 to 1000.

Dub.

Take of
- Nitrate of kali, six pounds ;
- Sulphuric acid, four pounds.

Mix and distil, until the residuum becomes dry.

The specific gravity of this acid is 1500.

ACIDUM NITRICUM. *Ed.*

Nitric Acid.

Take of
- Nitrous acid, any quantity.

Pour it into a retort, and having adapted a receiver, apply a very gentle heat, until the reddest portion shall have passed over, and the acid which remains in the retort shall have become nitric acid.

Lond.

Take of
Nitrate of potass dried,
Sulphuric acid, each two pounds.

Mix in a glass retort, and distil off the nitric acid from a sand bath until red fumes appear. Then re-distil the acid in the same manner, having previously added another ounce of dried nitrate of potass.

The specific gravity of nitric acid is 1.5. If a piece of limestone be put into an ounce of it, diluted with water, seven drachms should be dissolved.

In this process, the sulphuric acid, by its superior affinity, combines with the potass of the nitre, to form sulphate of potass, while the nitric acid is separated, and is converted into vapour, by the application of the heat to the retort, and is condensed in the receiver.

In performing this process, we must take care, in pouring in the sulphuric acid, not to soil the neck of the retort. Instead of a common receiver, it is of advantage to use some modification of Woulfe's apparatus; and as the vapours are extremely corrosive, the fat lute must be used to connect the retort with it. The London college formerly used no more sulphuric acid than what was necessary to expel all the nitric acid, and the residuum was a neutral sulphate of potass, so insoluble, that it could not be got out without breaking the retort. The Edinburgh and Dublin colleges order as much sulphuric acid as renders the residuum an acidulous sulphate of potass, easily soluble in water, and the London college now employ a still larger quantity. We are informed by Dr. Powell, that the reason for the adoption of these proportions for nitric acid, is expressed in the following report to the college.

Dried nitre.	Sulph. acid.	Colour of product.	Sp. Gr.	Weight of product.	Marble dissolved.	Relative value.
6	6	White.	1.50	4	0.73	29
6	3	Red.	1.53	3	0.70	21
60	29	Red.	1.456	30+	0.62	19+

When the proportions were, 6 nitric and 3 sulphuric acid, there remained no redundant acid." It is again to be regretted, that, in this report, there is no statement of the results of the process of the Edinburgh and Dublin college; for although the old London proportions of one half acid was manifestly too little, equal parts may be too much, and the intermediate proportions of 6 to 4 may be preferable to either. It is also singular, that there should be so great a difference between the second and third of the results stated, when the difference in the materials used is so trifling; that the specific gravity of the first product, consisting of nitric acid, should be less than that of the second, red nitrous acid; and that of these two, the one whose specific gravity is less should dissolve most marble.

Nitrous acid is frequently impure. Sulphuric acid is easily got rid of by re-distilling the nitrous acid from a small quantity of nitrate of potass, and this rectification forms part of the new London process; as, from the large proportion of sulphuric acid used by them, this contamination is more likely to take place. But its presence is not indicated when nitrous acid forms a precipitate with nitrate of baryta, as affirmed by almost all chemical authors; for nitrate of baryta was discovered by Mr. Hume to be insoluble in nitrous acid.

Muriatic acid is detected by the precipitate formed with nitrate of silver, and may be separated by dropping into the nitrous acid a solution of nitrate of silver, as long as it forms any precipitate, and drawing off the nitrous acid by distillation.

Mr. Davy has shewn, that nitrous acid is a compound of nitric acid and nitric oxide; and that, by additional doses of the last constituent, its colour is successively changed from yellow to orange, olive green, and blue green, and its specific gravity is diminished. As commonly prepared, the acid is more or less high-coloured and emits red fumes, whereas pure nitric acid emits only white fumes. Hence the Edinburgh college have given a process for converting nitrous into nitric acid, which Dr. Powell thinks uneconomical; as not only nitrous gas, but a large proportion of the acid itself, passes to waste.

By the application of a gentle heat, the whole of the nitric oxide is vaporized, and pure colourless nitric acid remains in the retort. The nitric oxide, however, carries over with it a portion of the acid, and condenses with it in the receiver, in the form of a very high-coloured nitrous acid.

Richter has given the following manner of preparing nitric acid. Take of

Purified nitrate of potass, seven pounds;
Black oxide of manganese, one pound two ounces;
Sulphuric acid, four pounds, four ounces, and six drachms.

Into a retort capable of containing twenty-four pounds, introduce the nitre and manganese, powdered and mixed, and pour upon them gradually, through a retort-funnel, the sulphuric acid. Lute on the receiver with flour and water, and conduct the distillation with a gradually increased heat.

From these proportions, Richter got three pounds nine ounces of very slightly coloured nitric acid. The operation will be conducted with less hazard in a Woulfe's apparatus, or by interposing between the retort and a receiver a tubulated adopter, furnished with a bent tube, of which the further extremity is immersed in a vessel containing a small quantity of water.

The specific gravity of nitrous acid is probably stated too high by the Edinburgh college; for, although Rouelle makes that of the strongest nitric acid 1.583, yet Kirwan could produce it no stronger at 60 than 1.5543, and Mr. Davy makes it only 1.504, and when saturated with nitric oxide, only 1.475.

ACIDUM NITROSUM DILUTUM. *Ed.*

Diluted Nitrous Acid.

Take of
Nitrous acid,
Water, equal weights.
Mix them, taking care to avoid the noxious vapours.

Dub.

Take of
Nitrous acid,
Distilled water, each one pound.
Mix.
The specific gravity is 1280.

ACIDUM NITRICUM DILUTUM. *Lond.*

Diluted Nitric Acid.

Take of
Nitric acid, one fluidounce;
Distilled water, nine fluidounces.
Mix.

Nitrous acid has a great affinity for water, and attracts it from the atmosphere. During their combination there is an increase of temperature, part of the nitric oxide is dissipated in the form of noxious vapours, and the colour changes successively from orange to green, and to blue, according as the proportion of water is increased. A mixture of equal parts of Kirwan's standard acid of 1.5543 and water, has the specific gravity 1.1911.

The following is Dr. Powell's commentary upon this process: "One ounce of nitric acid, by measure, is equal to about two ounces by weight, and one ounce of this diluted acid will saturate nearly one hundred of white marble. An admixture of equal weights of nitric acid and water, was directed under this same title in the former Pharmacopœia, which was, in point of strength, as an acid, to the present, nearly as 16 to 10." In this statement there are several errors of great importance, which it is absolutely necessary to correct. It makes nitric acid actually heavier than sulphuric. In fact, one ounce of nitric acid, by measure, is only equal to one ounce, three drachms, 21.75 grains, by weight; and, upon his own data, one liquidounce of nitric acid will saturate only 49.77 grains, not one hundred ounces. Lastly, the strength of the diluted nitric acid of the former London Pharmacopœia, is to that of the present as 35, not 16, to 10.

THESE acids, the nitrous and nitric, have been long employed as powerful pharmaceutic agents. Their application in this way I shall have many opportunities of illustrating.

Medical use.—Lately, however, their use in medicine has been considerably extended. In the state of vapour they have been used to destroy contagion in goals, hospitals, ships, and other places where the accumulation of animal effluvia is not easily avoided. The fumigating such places with the vapour of nitrous acid has certainly been attended with success; but we have heard that success ascribed entirely to the ventilation employed at the same time. Ventilation may unquestionably be carried so far, that the contagious miasmata may be diluted to such a degree that they shall not act on the body; but to us it appears no less certain, that these miasmata cannot come in contact with nitric acid or oxy-muriatic acid vapour, without being entirely decomposed and completely destroyed. Fumigation is, besides, applicable in situations which do not admit of sufficient ventilation; and where it is, the previous diffusion of acid vapours is an excellent check upon the indolence and inattention of servants and nurses, as by the smell we are enabled to judge whether they have been sufficiently attentive to the succeeding ventilation. Nitric acid vapour, also, is not deleterious to life, and may be diffused in the apartments of the sick, without occasioning to them any material inconvenience. The means of diffusing it are easy. Half an ounce of powdered nitre is put into a saucer, which is placed in a pipkin of heated sand. On the nitre two drachms of sulphuric acid are then poured. The fumes of nitric acid immediately begin to rise. This quantity will fill with vapour a cube of ten feet; and by employing a sufficient number of pipkins, the fumes may be easily made to fill a ward of any extent. For introducing this practice, Dr. Carmichael Smyth received from the British parliament a reward of five thousand pounds.

The internal use of these acids has also been lately much extended. In febrile diseases, water acidulated with them forms one of the best antiphlogistic and antiseptic drinks we are acquainted with. Hoffmann and Eberhard long ago employed it with very great success in malignant and petechial fevers; and in the low typhus, which frequently rages among the poor in the suburbs of Edinburgh, I have repeatedly given it with unequivocal advantage. In the liver complaint of the East-Indies, and in syphilis, nitric acid has also been extolled as a valuable remedy by Dr. Scott, and the evident benefits resulting from its use in these complaints has given rise to a theory, that mercury only acts by oxygenizing the system. It is certain that both the primary and secondary symptoms of syphilis have been removed by the use of these acids, and that the former symptoms have not returned, or been followed by any secondary symptoms. But in many instances they have failed; and it is doubtful if ever they effected a permanent cure, after the secondary symptoms appeared. Upon the whole, the opinions of Mr. Pearson on this subject, lately agitated with so much keenness, appear to us so candid and judicious, that we shall insert them here. He does not think it eligible to rely on the nitrous acid in the treatment of any one form of the lues venera: at the same time, he by no means wishes to see it exploded as a medicine altogether useless in that disease. When an impaired state of the constitution renders the introduction of mercury into the system inconvenient, or evidently improper, the nitrous acid will be found, he thinks, capable of restraining the progress of the disease, while, at the same time, it will improve the health and strength of the patient. On some occasions, this acid may be given in conjunction with a mercurial course, and it will be found to support the tone of the stomach, to determine powerfully to the kidneys, and to counteract, in no inconsiderable degree, the effects of mercury on the mouth and fauces.

ACIDUM MURIATICUM. *Ed.*

Muriatic Acid.

Take of
- Muriate of soda, two pounds;
- Sulphuric acid, sixteen ounces;
- Water, one pound.

Heat the muriate of soda for some time red-hot in a pot, and after it has cooled, put it into a retort. Then pour upon the muriate of soda the acid mixed with the water and allowed to cool. Lastly, distil in a sand bath, with a moderate fire, as long as any acid is produced.

The specific gravity of this acid is to that of distilled water as 1170 to 1000.

Lond.

Take of
- Dried muriate of soda, two pounds;
- Sulphuric acid, one pound and a half;
- Distilled water, a pint and a half.

First mix the acid with half a pound of the water in a glass retort, and add to the mixture, after it has cooled, the muriate of soda. Pour the rest of the water into the receiver; then having fitted on the retort, distil the muriatic acid over into this water, with the heat of a sand bath gradually increased to redness.

The specific gravity of this acid is to that of distilled water as 1170 to 1000.

If a piece of lime-stone be put into a fluidounce of this acid diluted with water, half an ounce should be dissolved.

Dub.

Take of
Muriate of soda, dried,
Sulphuric acid,
Water, each six pounds.

Add the acid, diluted with the water, after it has cooled, gradually to the salt, in a glass retort, and then distil the liquor, until the residuum become dry.

The specific gravity of this acid is 1170.

In this process the muriate of soda is decomposed, and the muriatic acid disengaged by the superior affinity of the sulphuric acid. But as muriatic acid is a permanently elastic fluid, the addition of the water is absolutely necessary for its existence in a fluid form. The London college put a portion of water into the receiver, for the purpose of absorbing the muriatic acid gas, which is first disengaged, and which would otherwise be lost for want of water to condense it: the other colleges, however, order the whole of the water to be previously mixed with the sulphuric acid; and it is indispensably necessary that the mixture of acid and water be allowed to cool before it be added to the salt; for the heat produced is so great, that it would not only endanger the breaking of the retort, but occasion considerable loss and inconvenience, by the sudden disengagement of muriatic acid gas. Dr. Powell thinks it is an improvement to add the salt to the diluted acid.

The muriate of soda is directed by Dublin and Edinburgh to be heated to redness, before it be introduced into the retort, that the whole of the water of crystallization may be expelled, which, being variable in quantity, would otherwise affect the strength of the acid produced; and besides, without this precaution, the acid obtained is too high-coloured. The London college use the salt dried, but not decrepitated.

If a common retort and receiver be employed for this distillation, they must not be luted perfectly closely; for if any portion of the gas should not be absorbed by the water employed, it must be allowed to escape; but the process will be performed with greater economy, and perfect safety, in a Woulfe's, or some similar apparatus.

The residuum in the retort consists principally of sulphate of soda, which may be purified by solution and crystallization; and to save the retort, Dr. Powell directs it to be filled with boiling water, after the process is over, and it has cooled down to 212°.

If properly prepared, the muriatic acid is perfectly colourless, and possesses the other properties already enumerated; but in the shops it is very seldom found pure. It almost always contains iron, and very frequently sulphuric acid or copper. The copper is detected by the blue colour produced by super-saturating the acid with ammonia, the iron by the black or blue precipitate formed with tincture of galls or prussiate of potass. The sulphuric acid may be easily got rid of by re-distilling the acid from a small quantity of dried muriate of soda. But Mr. Hume discovered, that muriate of baryta is precipitated when poured into muriatic acid, although it contain no sulphuric acid.

Medical use.—In its effects on the animal economy, and the mode of its employment, it coincides with the acids already mentioned, which almost proves, that they do not act by oxygenizing the system, as the muriatic acid cannot be disoxygenized by any substance or process with which we are acquainted.

ACIDUM MURIATICUM DILUTUM. *Dub.*
Diluted Muriatic Acid.

Take of
Muriatic acid,
Distilled water, each one pound. Mix.
The specific gravity is 1080.

This diluted acid, of a fixed strength, is convenient for apportioning its dose; and as it is now introduced by the Dublin college, it is to be hoped that the same proportions will be adhered to by the others.

AQUA ALCALINA OXYMURIATICA. *Dub.*
Oxymuriatic Alkaline Water.

Take of
Dried muriate of soda, two pounds;
Manganese, in powder, one pound;
Water;
Sulphuric acid, each two pounds.

Mix the muriate of soda and manganese; put them into a matrass, and pour on the water. Then, by means of a proper apparatus, add the sulphuric acid gradually, and at different times, and pass the gas extricated through a solution of four ounces of carbonate of kali, in twenty-nine ounces, by mea-

sure, of water. Towards the end of the operation, heat the matrass moderately.
The specific gravity is 1687.

THIS is a solution of the oxygenated muriate of potass. The oxymuriatic acid is disengaged in the matrass, by the action of the sulphuric acid on the muriate of soda, and black oxide of manganese, which latter furnishes the additional dose of oxygen to the muriatic acid disengaged from the former; and the oxymuriatic acid gas thus formed, readily combines with the potass of the solution, through which it is made to pass while the carbonic acid is expelled.

A solution of the oxymuriate of potass was some years ago strongly recommended as an antisyphilitic remedy, and its use was extended to other cutaneous diseases, and finally to fever and spasmodic diseases, as a general stimulant. It was given in the dose of from three to ten grains, four times a-day, gradually increasing to 25 or 30. At the time, many singular cures performed by means of it were recorded, but it has fallen into disuse, and we do not now hear of its employment; although its introduction so lately into the Dublin Pharmacopœia would lead us to presume that it is still used in Ireland. It sometimes acted as a diuretic, always as a stimulant; and it is singular, that in some cases, in which it produced little or no effect, it passed off undecomposed in the urine. In these cases Mr. Cruickshank proposed to remedy the defect, by giving, after each dose, 10 or 15 drops of muriatic acid.

AQUA OXYMURIATICA. *Dub.*
Oxymuriatic Water.

Is prepared by transmitting, in a proper apparatus, the superfluous gas of the preceding process through a pint of water.
The specific gravity is 1003.

THE oxygenated muriatic acid was also, when the chemical pathology was fashionable, recommended as an antisyphilitic remedy, and it certainly seemed, in some instances, to effect cures; but it has since been laid aside. Mr. Braithwaite also recommended it strongly in scarlatina. He gave, according to the age of the patient, from half a drachm to a drachm, in the course of the day, mixed with eight ounces of distilled water; but it is advisable to divide it into doses, in different phials, as it loses every time the phial is opened, and it should be kept in a dark place.

THE vapours of this powerfully oxygenizing acid have been recommended by Morveau as the best means of destroying contagion. As, however, they are deleterious to animal life, they cannot be employed in every situation. Where applicable, they are easily disengaged by mixing together ten parts of muriate of soda, and two parts of black oxide of manganese in powder, and pouring upon the mixture, first four parts of water, and then six parts of sulphuric acid. Fumes of oxygenized muriatic acid are immediately disengaged.

Morveau has since contrived what he calls Dis-infecting or Preservative phials. If intended to be portable, 46 grains of black oxide of manganese, in coarse powder, are to be put into a strong glass phial, of about $2\frac{1}{3}$ cubic inches capacity, with an accurately ground stopper, to which must be added about $\frac{45}{100}$ of a cubic inch of nitric acid of 1.4 specific gravity, and an equal bulk of muriatic acid of 1.134; the stopper is then to be replaced, and the whole secured by inclosing the phial in a strong wooden case, with a cap which screws down so as to keep the stopper in its place. They are to be used by simply opening the phial without approaching it to the nose, and shutting it as soon as the smell of the muriatic gas is perceived. A phial of this kind, if properly prepared, will preserve its power during many years. For small wards, strong bottles, with ground stoppers an inch in diameter, of about 25 or 27 cubic inches of capacity, may be used, with 372 grains of the oxide, and 3.5 inches of each of the acids, and the stopper kept in its place by leaden weights; or for larger wards, very strong glass jars, about 43 cubic inches in capacity, containing a drachm of the oxide, and 6 inches of each of the acids. These jars are to be covered with a plate of glass, adjusted to them by grinding with emery, and kept in its place by a screw. In no case is the mixture to occupy more than one third of the vessel.

ACIDUM ACETOSUM DESTILLATUM. *Ed.*

Distilled Acetous Acid.

Let eight pounds of acetous acid be distilled in glass-vessels, with a gentle heat. The two first pounds which come over, being too watery, are to be set aside; the next four pounds will be the distilled acetous acid. The remainder furnishes a still stronger, but empyreumatic acid.

ACETUM DISTILLATUM. *Dub.*

Distilled Vinegar.

Take of
Vinegar, ten pints.
Draw off, with a gentle heat, six pints.
Glass vessels are to be employed in this distillation, and the first pint, which comes over, is to be rejected.
The specific gravity of this acid is 1006.

ACIDUM ACETICUM. *Lond.*
Acetic Acid.

Take of
Vinegar, a gallon.
Distil the acetic acid in a sand bath, from a glass retort, into a cooled glass receiver; then, having thrown away the first pint, preserve the next six.

VINEGAR, when prepared from vinous liquors by fermentation, besides acetous acid and water, contains extractive, super-tartrate of potass, and often citric or malic acid, alcohol, and a peculiar agreeable aroma. These substances, particularly the extractive and super-tartrate of potass, render it apt to spoil, and unfit for pharmaceutic and chemical purposes. By distillation, however, the acetic acid is easily separated from such of these substances as are not volatile. But by distillation it loses its agreeable flavour, and becomes considerably weaker; for the water being rather more volatile than acetic acid, comes over first, while the last and strongest portion of the acid cannot be obtained free from empyreuma.

This process may be performed in a common still, but a retort is preferable. The best kinds of wine vinegar should be used; and, even with these, if the distillation be carried on to any great length, it is extremely difficult to avoid empyreuma. The best method, however, is, if a retort be used, to place the sand but a little way up its sides, and, when somewhat more than half the liquor has come over, to pour on the remainder a quantity of fresh vinegar equal to the liquor drawn off. This may be repeated three or four times; the vinegar supplied at each time being previously heated, as the addition of cold liquor would not only prolong the operation, but also endanger the breaking of the retort. Lowitz recommends the addition of half an ounce of recently burnt and powdered charcoal to each pound of vinegar in the still, as the best means of avoiding empyreuma.

If the common still be employed, it should likewise be occasionally supplied with fresh vinegar, in proportion as the acid runs off, and this continued until the process cannot be conveniently carried farther. The distilled acid must be rectified by a second distillation, in a retort or glass alembic; for, although the head and receiver be of glass or stone-ware, the acid will contract a metallic taint from the pewter worm.

The residuum of this process is commonly thrown away as useless. If mixed with about three times its weight of fine dry sand, and committed to distillation in a retort, with a well-regulated fire, it yields an exceedingly strong empyreumatic acid. Besides, it is, without any rectification, better for some purposes, as being stronger than the pure acid; particularly for making acetate of potass or soda: for, in the process, the empyreumatic oil is burnt out.

Distilled vinegar should be colourless and transparent, specific gravity from 1.007 to 1.0095; have a pungent smell, and purely acid taste, totally free from acrimony and empyreuma, and should be entirely volatile. It should not form a precipitate on the addition of a solution of baryta, or of water saturated with sulphuretted hydrogen; or change its colour when super-saturated with ammonia. These circumstances shew, that it is adulterated with sulphuric acid, or contains lead, copper, or tin.

Distilled acetous acid, in its effects on the animal economy, does not differ from vinegar; and as it is less pleasant to the taste, it is only used for pharmaceutical preparations.

ACIDUM ACETICUM. *Dub.*

Acetic Acid.

Take of

Acetate of kali, six ounces;

Sulphuric acid, three ounces, by weight.

Pour the acid into a tubulated retort, and gradually add the acetated kali in different portions, waiting, after every addition, until the mixture cools; then distil off the acid, with a moderate heat, until the residuum become dry.

The specific gravity of this acid is 1070.

ACIDUM ACETOSUM FORTE. *Ed.*

Strong Acetous Acid.

Take of

Sulphate of iron dried, one pound;

Acetite of lead, ten ounces.

Having rubbed them together, put them into a retort, and distil in a sand bath, with a moderate heat, as long as any acid comes over.

By these processes, the acid we have before noticed, under the title of acetic acid, is prepared. It is now generally believed to differ from distilled vinegar only in strength, and in being perfectly free from all mucilaginous matter; therefore, according to the principles of nomenclature, which gives simple names to simple substances, the strong acid should be acetic acid, and our present acetous acid should be weak or dilute acetic acid.

Many different processes have been proposed for preparing acetic acid, but they may be arranged in three classes. It may be prepared,

1. By decomposing metalline acetates by heat.
2. ———————— acetates by sulphuric acid.
3. ———————— acetates by sulphates.

The process in the former edition of the London college is an example of the first kind; but the heat necessary for decomposing verdigris is so great, that it decomposes part of the acetic acid itself, and gives the product an empyreumatic and unpleasant smell.

By the superior affinity of sulphuric acid, the acid may be easily expelled from every acetate, whether alkaline or metallic; but part of the sulphuric acid seems to be deprived of its oxygen, and to be converted into sulphurous acid, which renders the product impure.

The processes of the last kind are preferable to the others in many respects. They are both more economical, and they furnish a purer acid. Mr. Lowitz directs one part of carefully dried acetate of soda to be triturated with three parts of super-sulphate of potass, and the distillation to be conducted in a glass retort, with a gentle heat. The Berlin college mix together twelve ounces of sulphate of potass with six sulphuric acid, diluted with eighteen of water, and evaporate to dryness. With the super-sulphate of potass, thus prepared, they decompose nine ounces of acetate of soda, dried with a gentle heat*. The process of the Edinburgh college also belongs to this class, and was first proposed by C. Badollier, apothecary at Chartres.

Medical use.—It is almost solely used as an analeptic remedy in syncope, asphyxia, hysteric affections, and headachs. Applied to the skin, it acts as a stimulant and rubefacient, but it is most frequently snuffed up the nostrils in the state of vapour.

ACIDUM BENZOICUM. *Ed.*

Benzoic Acid.

Take of
  Benzoin, twenty-four ounces;
  Carbonate of soda, eight ounces;
  Water, sixteen pounds.

Triturate the benzoin with the carbonate, then boil in the water for half an hour, with constant agitation, and strain. Repeat the decoction, with other six pounds of water, and strain. Mix these decoctions, and evaporate, until two pounds remain. Filter anew, and drop into the fluid, as long as it produces any precipitation,

Diluted sulphuric acid.

Dissolve the precipitated benzoic acid in boiling water, strain the boiling solution through linen, and set it aside to crystallize. Wash the crystals with cold water, dry and preserve them.

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* The acid residuum of the distillation of nitrous acid, would be a very economical substitute.

Dub.

Take of
  Benzoin, any quantity.

Liquefy it in a retort with a wide throat, having a receiver fitted to it, but not luted, and sublime. Remove the sublimed matter occasionally from the neck of the retort, lest it accumulate in too great a quantity. If it be soiled with oil, press it, folded up in blotting paper, and repeat the sublimation.

Lond.

Take of
  Benzoin, one pound and a half;
  Fresh lime, four ounces;
  Water, a gallon and a half;
  Muriatic acid, four fluidounces.

Triturate the benzoin with the lime, then boil for half an hour in a gallon of water, stirring it assiduously, and decant the liquor when cold. Boil the residuum in four pints of water, and decant the liquor as before: then boil down the liquors mixed together, to one half; filter through paper, and gradually drop in the muriatic acid, until there be no more precipitate.

Lastly, having poured off the liquor, dry the powder with a gentle heat, put it in a proper vessel, placed in a sand bath, and sublime the benzoic acid with a gentle heat.

THE distinguishing character of balsams, is their containing benzoic acid, which may be separated from the resin, their other principal constituent, either by sublimation, or by combining it with a salifiable base. The Dublin college directs it to be done in the former way. But, even with the greatest care, it is almost impossible to manage the heat so as not to decompose part of the resin, and thus give rise to the formation of an empyreumatic oil, which contaminates the product. Nor can it be freed completely from the empyreumatic oil by bibulous paper.

The other method of separating benzoic acid from resin, was first practised by Scheele, who employed lime-water; Göttling afterwards used carbonate of potass; and, lastly, Gren used carbonate of soda, which has been adopted by the Berlin college, and now by that of Edinburgh. Mr. Brande, and he has been followed by the London college, prefers Scheele's process, as the lime dissolves less of the resin of the benzoin than the alkalies do. In experiments, which he made for the purpose of ascertaining the comparative value of the different processes, he obtained from one pound of benzoin,

	Oz.	Dr.	Scr.	Grs.
By sublimation, - - -	2	0	0	0
— Scheele's process, - -	1	6	2	19
— Gren's and Göttling's process,	1	5	1	10
— boiling benzoin in water, -	1	0	0	10

As the crystallized acid, on account of its lightness and elasticity, is not easily reduced to powder, for most purposes it will be more convenient to keep it in the state of a precipitate.

It may also be extracted from storax, and all the other balsams, particularly those of Tolu or Peru; and from the urine of children, and of herbivorous animals.

The benzoic acid has an agreeable taste and a fragrant smell, especially when heated. It is soluble in alcohol, and in boiling water, but very sparingly in cold water, although it may be suspended in it, by means of sugar, so as to form an elegant balsamic syrup.

ACIDUM CITRICUM. *Lond.*

Citric Acid.

Take of

Lemon juice, one pint;

Prepared chalk, one ounce, or as much as may be required to saturate the juice;

Diluted sulphuric acid, nine fluidounces.

To the lemon juice, heated to ebullition, gradually add the chalk; mix them, and decant the liquor. Wash the citrate of lime, which remains, in repeated waters, and then dry it. Then pour upon the dried powder the diluted sulphuric acid; boil for ten minutes, strain it through a cloth with strong expression, and filter through paper. Evaporate the filtered liquor with a gentle heat, until it form crystals on cooling.

In order to render the crystals pure, they must be dissolved twice, or oftener, in water, filtered each time, evaporated and crystallized.

This process, which was contrived by Scheele, has been already explained in the materia medica, into which citric acid has been introduced by the Dublin college. In some respects this concrete acid is superior, and in others greatly inferior to lemon juice. It has not the flavour; and what is of more consequence, it has not the freshness of the fruit but from its solid form and gradual solution it is convenient, and is excellently adapted, for effervescing mixtures Dissolved in eight waters, it is said to be equal in strength to lemon juice.

OLEUM SUCCINI ET ACIDUM SUCCINI. *Ed.*

Oil o Amber and Succinic Acid.

Take of

Amber reduced to powder, and of pure sand, equal parts.

Mix them, and put them into a glass retort, of which the mixture may fill one half: then adapt a large receiver, and distil in a sand bath, with a fire gradually increased. At first, a watery liquor will come over, with some yellow oil; then a yellow oil, with an acid salt; and, lastly, a reddish and black-coloured oil.

Pour the liquor out of the receiver, and separate the oil from the water. Press the salt collected from the neck of the retort and sides of the receiver between folds of blotting paper, to free it from the oil adhering to it; then purify it by solution in warm water and crystallization.

ACIDUM SUCCINICUM. *Dub.*
Succinic Acid.

Take of
Amber,
Pure sand, each one pound.

Distil, with a heat gradually increased, an acid liquor, an oil, and a salt discoloured with oil. Let the salt be wrapt up in blotting paper, and compressed, to squeeze out the oil, and be again sublimed.

WE are not acquainted with any experiments which determine whether the succinic acid exists as such in the amber, or whether it be a product of the decomposition of the amber by the action of heat; for in the process employed for obtaining succinic acid the amber is completely decomposed.

The sand is added by the Dublin college to prevent the amber from running together into masses, and impeding the distillation; but as it renders the residuum unfit for the use of the varnisher, it is not advisable. According to Göttling, this distillation should be performed in a tubulated iron or earthen ware retort, exposed to the immediate action of the fire; for he says, that in a sand bath we cannot regulate the heat sufficiently, and that a glass retort is incapable of supporting the necessary temperature.

Besides the succinic acid collected from the neck of the retort, and sides of the receiver, the oil washes down a portion of it into the receiver, and the watery liquor which comes over is saturated with it. But the whole of it may be obtained by agitating the oil with some boiling water, which will dissolve the acid. This solution is then to be added to the acid liquor, and the acid they contain is easily obtained by evaporation and crystallization. The acid may afterwards be purified by solution in boiling water and crystallization, according to the directions of the colleges.

But even after repeated solutions and crystallizations, a portion of empyreumatic oil still adheres to the acid, and renders it impure. Other methods of purifying it have been therefore attempted. Demachy saturated it with lime, separated the lime by sulphuric acid, and sublimed the succinic acid: Richter saturated succinic acid with potass, decomposed the salt formed with acetate of lead, and disengaged the succinic acid from the lead by means of diluted sulphuric acid: lastly, Morveau asserts that he obtained it in a state of perfect purity, by treating it with nitrous acid. It is often adulterated with muriate of ammonia, sulphuric acid, sulphate of potass, sugar, &c. When pure it is entirely volatile, gives out no ammoniacal fumes when triturated with potass, is not precipitated by solutions of baryta, and is soluble in alcohol.

Succinic acid, although retained in the Edinburgh and Dublin Pharmacopœias, is never used in medicine. It has been rejected from the New London.

CHAP. III.—ALKALIES.

AQUA POTASSÆ; vulgo, LIXIVIUM CAUSTICUM. *Ed.*
Water of Potass, commonly called *Caustic Ley.*

Take of
Newly prepared lime, eight ounces;
Carbonate of potass, six ounces.

Put the lime into an iron or earthen vessel, with twenty-eight ounces of warm water. After the ebullition is finished, instantly add the salt; and having thoroughly mixed them, cover the vessel till they cool. When the mixture has cooled, agitate it well, and pour it into a glass funnel, the throat of which is obstructed with a piece of clean linen. Cover the upper orifice of the funnel, and insert its tube into another glass vessel, so that the water of potass may gradually drop through the rag into the lower vessel. As soon as it ceases to drop, pour into the funnel some ounces of water; but cautiously, so that it may swim above the matter in the funnel. The water of potass will again begin to drop, and the affusion of water is to be repeated in the same manner, until three pounds have dropped, which will happen in the space of two or three days; then mix the superior and inferior parts of the liquor together by agitation, and keep it in a well-stopt phial.

LIQUOR POTASSÆ. *Lond.*
Solution of Potass.

Take of
Sub-carbonate of potass,

Fresh lime, each one pound;
Distilled water, boiling, a gallon.

Dissolve the potass in two pints of the water; add the rest of the water to the lime. Mix the hot liquors, set the mixture aside in a covered vessel; and after it has cooled, filter it through cotton cloth.

If any diluted acid, dropt into it, excite effervescence, more lime must be added, and the filtration repeated.

A pint of this liquor should weigh sixteen ounces.

AQUA KALI CAUSTICI. *Dub.*
Water of Caustic Kali.

Take of

Fresh burnt lime, eight ounces;
Sub-carbonate of kali, six ounces.

Put the lime into an earthen vessel, and sprinkle upon it two pints of boiling water. With the slaked lime mix the salt, and cover the vessel. Pour the mass, as soon as it has cooled, into a glass funnel, whose throat is obstructed with a rag. Having covered the funnel, let the ley drop into a vessel placed below it, and pour water from time to time into the funnel, until three pints have passed through.

Let the liquor be agitated, and kept in a bottle of green glass well closed.

If the ley be rightly prepared, it will have neither colour nor smell, and will scarcely effervesce when mixed with acids. If it effervesce considerably, add a little fresh burnt lime, in very fine powder; digest for twenty-four hours in a close vessel, with occasional agitation; then filter the ley in the manner already directed.

The specific gravity of this liquor is to that of distilled water as 1100 to 1000.

THESE processes do not differ materially. They are founded upon the affinity of lime being stronger than that of potass for carbonic acid. Of course, when lime comes in contact with carbonate of potass, the carbonic acid quits the potass to unite with the lime, and the results of the mixture are potass and carbonate of lime. Now, as the carbonate of lime is insoluble in water, and the potass is very soluble, they may be separated by filtration. In doing this, however, we must take care to employ instruments on which the solution of potass does not act, and to prevent the free access of air, from which it would attract carbonic acid, and thus frustrate the whole operation. The latter object is attained by covering the upper or broad end of the funnel with a plate of glass, and inserting the lower end into the neck of a phial, which it fits pretty closely. The former object is attended with greater difficulties, and indeed scarcely to be effected, so powerful and general is the agency of potass. All animal substances are immediately attacked and destroyed by it; therefore, our filters cannot be made of silk, woollen, or paper which contains glue; and although neither vegetable matters nor silica entirely escape its action, linen and sand are, on the whole, the least objectionable. A filter of sand was used by Dr. Black: he first dropt a rugged pebble into the tube of the funnel, in some part of which it formed itself a firm bed, while the inequalities on its surface afforded interstices of sufficient size for the passage of the filtering liquor. On the upper surface of this stone he put a thin layer of lint or clean tow; immediately above this, but not in contact with it, he dropped a stone similar to the former, and of a size proportioned to the swell in the upper part of the tube of the funnel. The interstices between this second stone and the funnel were filled up with stones of a less dimension, and the gradation uniformly continued till pretty small sand was employed. Finally, this was covered with a layer of coarser sand, and small stones, to sustain the weight of the fluid. A filter of sand being thus constructed in the funnel, it was washed perfectly clean, by making clean water pass through it, till it dropt from the lower extremity of the funnel perfectly clear and transparent; and before using it, it was allowed to stand for some days, that no water might remain among the interstices of the sand.

From the spongy nature of the residuum which remains upon the filter, and especially if we use that of sand, a considerable quantity of the solution of potass will be retained. It is, however, easily obtained, by pouring gently over it, so as to disturb it as little as possible, a quantity of water; the ley immediately begins again to drop from the funnel, and as, from the difference of their specific gravity, the water does not mix with it, but swims above it, the whole ley passes through before any of the water. By means of the taste we easily learn when the whole ley has passed.

As it is natural to suppose that the strongest solution will pass first, and the weakest last, we are directed to agitate the whole together, to render their strength uniform.

If the solution of potass be pure, it will be colourless, and it will neither effervesce with acids, nor form a precipitate with carbonate of potass. If it effervesces, carbonic acid is present, and must be separated by again boiling the solution with a little lime, or by dropping into it lime-water, as long as it produces any precipitate. If, on the contrary, it contain lime, from too much of it having been employed in the preparation, it may be separated by dropping into the ley a solution of the carbonate of potass. When we have thus purified our solution of potass, it must be again filtered.

Medical use.—The solution of caustic potass, under various names, has at different times been celebrated as a lithontriptic, and as often fallen again into disuse. The very contradictory accounts of its effects as a solvent are now, in some degree, explicable, since it has been discovered that urinary calculi are very different in their natures, so that some of them are only soluble in acids, and others only in alkalies. Of the last description are the calculi of uric acid, which are very frequent, and those of urate of ammonia. On these, therefore, alkalies may be supposed to make some impression; and that alkalies, or alkaline carbonates, taken by the mouth, have occasionally relieved calculous complaints, is certain. It is, however, said that their continued use debilitates the stomach; and M. Fourcroy has proposed applying the remedy immediately to the disease, by injecting into the bladder a tepid solution of potass or soda, so dilute that it can be held in the mouth. Before the alkaline solution be injected, the bladder is to be completely evacuated of urine, and washed out with an injection of tepid water. After the alkaline injection has remained in the bladder half an hour or more, it is to be evacuated, and allowed to settle. If, on the addition of a little muriatic acid, a precipitate be formed, we shall have reason to conclude that the calculus contains uric acid, and that the alkali has acted on it.

Very dilute alkaline solutions may also be taken into the stomach as antacids, but we possess others which are preferable.

Externally, alkaline solutions have been more frequently used, either very dilute, simply as a stimulus, in rickets, gouty swellings, gonorrhœa, and spasmodic diseases, or concentrated as a caustic, to destroy the poison of the viper, and of rabid animals.

POTASSA; olim, CAUSTICUM COMMUNE ACERRIMUM. *Ed.*
Potass; formerly *Strongest Common Caustic.*

Take of

The solution of potass, any quantity.

Evaporate it in a covered very clean iron vessel, till, on the ebullition ceasing, the saline matter flows gently like oil, which happens before the vessel becomes red. Then pour it out on a smooth iron plate; let it be divided into small pieces before it hardens, and immediately deposited in a well-stopt phial.

POTASSA FUSA. *Lond.*
Melted Potass.

Take of

Liquor of potass, one gallon.

Evaporate the water in a clean iron vessel, over the fire, until after the cessation of the boiling the potass melt. Pour this out upon an iron plate into proper forms.

KALI CAUSTICUM. *Dub.*
Caustic Kali.

Take of

Water of caustic kali, any quantity.

Evaporate it over the fire in a very clean iron vessel, until, the ebullition having ceased, the saline matter, on increasing the heat, remain almost at rest in the vessel. Let the liquefied salt be poured out upon an iron plate, and while it is congealing, be cut into proper pieces, which are immediately to be put into a well closed phial.

During the evaporation, let the operator avoid the drops spirted up.

THE principal thing to be attended to in this operation, is to conduct the evaporation so rapidly that the ley shall not absorb any carbonic acid from the atmosphere. As long as any water of solution remains, the ebullition is evident, and the evaporation is to be continued until it cease. The heat is then to be increased a little, which renders the potass perfectly fluid, and gives it the appearance of an oil, when it is ready to be poured out, either on a slab, as directed by the colleges, or into iron moulds, such as are used for the melted nitrate of silver.

The potass prepared according to these directions is sufficiently pure for medical use, but is not fit for chemical experiments. We can, however, obtain it perfectly white and crystallized, according to Berthollet, by adding to the ley, when evaporated so far that it would assume the consistence of honey, if permitted to cool, a quantity of alcohol, equal to one third of the carbonate of potass operated on, mixing them together, and letting them boil a minute or two. The mixture is then to be poured into a glass vessel, and corked up, when the impurities will gradually subside, partly in a solid form, and partly dissolved in water. The supernatant alcoholic solution is then to be evaporated rapidly, till its surface become covered with a black crust, which is to be removed, and the liquid below is to be poured into a porcelain vessel, when it will concrete into a white substance, which is to be broken in pieces, and immediately excluded from the action of the air.

A less expensive way of obtaining potass perfectly pure is that of Lowitz. Evaporate a solution of potass till a thick pellicle form on its surface; allow it to cool, separate all the crystals formed, as they consist of foreign salts: renew the evaporation, in an iron or silver bason; and remove the pellicles which form on the surface with an iron skimmer, as long as any appear. When the ebullition ceases, remove the vessel from the fire, and agitate the fused salt with an iron spatula while it cools. Dissolve the saline mass in twice its weight of water, and evaporate in a silver bason till it begins to crystallize. The crystals are pure potass. The fluid which swims over them has a dark brown colour, and must be poured off: but if kept in a close-stopt phial, it will deposit its colouring matter, and by evaporation will furnish more crystals of potass.

Medical use.—Potass is only used as a caustic, or to form solutions of a known strength; and even its use as a caustic is inconvenient, from its being so quickly affected by the air, and from its rapid deliquescence, which renders it apt to spread.

POTASSA CUM CALCE. *Ed.*
Potass with Lime.

Take of
Solution of potass, any quantity.
Evaporate in a covered iron vessel till one third remains; then mix with it as much new-slaked lime as will bring it to the consistence of pretty solid pap, which is to be kept in a vessel closely stopt.

Lond.

Take of
Solution of potass, three pints;
Fresh lime, one pound.
Boil down the liquor to one pound, then add the lime previously slaked, and mix them intimately.

KALI CAUSTICUM CUM CALCE. *Dub.*
Caustic Kali with Lime.

Evaporate water of caustic kali to one third, then add as much fresh burnt lime, in powder, as will form a sufficiently thick mass, which is to be kept in a well-closed vessel.

THE addition of the lime in these preparations renders them less apt to deliquesce, more easily managed, and milder in their operation.

CARBONAS POTASSÆ. *Ed.*
Carbonate of Potass.

Let impure carbonate of potass (called in English *pearl ashes*) be put into a crucible, and brought to a low red heat, that the oily impurities, if there be any, may be burnt out: then triturate it with an equal weight of water, and mix them thoroughly by agitation. After the feces have subsided, pour the liquor into a very clean iron pot, and boil to dryness, stirring the salt towards the end of the process, to prevent its sticking to the vessel.

POTASSÆ SUB-CARBONAS. *Lond.*

Sub-carbonate of Potass.

Take of
  Impure potashes, in powder, three pounds;
  Boiling water, three pints and a half.

Dissolve the potashes in the water, and filter, then pour it into a clean iron vessel, and evaporate the water by a gentle heat until the liquor become thick; then, having removed it from the fire, stir it constantly until it become a granulated salt.

A purer sub-carbonate of potass may be prepared in the same manner from Tartar, previously burnt till it becomes of an ash colour.

SUB-CARBONAS KALI. *Dub.*

Sub-carbonate of Kali.

Take of
  Potashes, in coarse powder,
  Cold water, each six pounds.

Mix them by trituration, and macerate them for a week in a wide vessel, with occasional agitation. Filter the ley, and evaporate it to dryness in a very clean iron vessel. Towards the end of the evaporation, stir the saline mass constantly with an iron spatula. When thus reduced to coarse powder, keep it in close vessels.

Before the ashes are dissolved in the water, if they be not sufficiently pure, roast them in a crucible till they become white.

CARBONAS POTASSÆ PURISSIMUS; olim, SAL TARTARI. *Ed.*

Pure Carbonate of Potass; formerly, *Salt of Tartar.*

Take of
  Impure super-tartrate of potass, any quantity.

Wrap it up in a moist bibulous paper, or put it into a crucible, and burn it into a black mass, by placing it among live coals. Having reduced this mass to powder, expose it in an open crucible to the action of a moderate fire, till it become white, or at least of an ash-grey colour, taking care that it do not melt. Then dissolve it in warm water; strain the liquor through a linen cloth, and evaporate it in a clean iron vessel, diligently stirring it, towards the end of the process, with an iron spatula, to prevent it from sticking to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, till the bottom of the vessel becomes almost red. Lastly, when the salt is grown cold, keep it in glass vessels, well stopped.

KALI E TARTARO. *Dub.*
Kali from Tartar.

Take of

Crystals of tartar, any quantity.

Heat them to redness in a silver crucible, loosely covered, until they cease to emit fumes. Reduce the mass which remains to coarse powder, and roast it for two hours in the same crucible, uncovered, stirring it frequently. Boil this in twice its weight of water, for a quarter of an hour, and after the liquor has become pure, pour it off. Repeat this three times.

Filter the mixed leys, and evaporate them in a silver bason. While the salt which remains is drying, granulate it by frequent agitation, and then heat it to a dull red. Take it out of the vessel before it is quite cold, and keep it in well stopped phials.

THE potash of commerce we have already shewn to contain a considerable proportion of foreign salts. By the process directed by the colleges, it is purified from those which are crystallizable; and, although it still contains muriate of potass and silica, it is sufficiently pure for the purposes of medicine.

The purest sub-carbonate of potass, in common use, is that obtained by incinerating the impure super-tartrate of potass, as all the substances it contains, except the potass, are decomposed by the heat. The tartaric acid and colouring matter are destroyed, and part of the carbonic acid, which is formed, unites with the potass.

But this salt, in whatever way obtained, is not strictly entitled to the appellation of carbonate, given it by the Edinburgh college; for it is not saturated with the acid, or rather it is a mixture of potass and carbonate of potass, in variable proportions. It is owing to the uncombined potass that it is still deliquescent, and in some degree caustic.

Medical use.—Sub-carbonate of potass is frequently employed in medicine, in conjunction with other articles, particularly for the formation of saline neutral draughts and mixtures: but it is used also by itself, in doses from three or four grains to fifteen or twenty; and it frequently operates as a powerful diuretic, particularly when aided by proper dilution.

POTASSÆ CARBONAS. *Lond.*
Carbonate of Potass.

Take of

Sub-carbonate of potass from tartar, one pound;

Carbonate of ammonia, three ounces;
Distilled water, one pint.

Add the carbonate of ammonia to the potass dissolved in the water. Then expose it for three hours to the heat of 180° in a sand bath, or until the ammonia be expelled. Lastly, set it aside to crystallize. The residuary liquor may be evaporated in the same manner, so as again to afford crystals on being set aside.

Sub-carbonate of potass is easily saturated, however, with carbonic acid, by exposing it, in solution, to the contact of the air for a considerable time, or by making a stream of carbonic acid gas pass through a solution of it, or by distilling it with carbonate of ammonia, as proposed by Berthollet, and directed by the London college. M. Curadau has invented a cheaper mode of saturating potass with carbonic acid. He dissolves the potass in a sufficient quantity of boiling water, mixes it with as much dried tanner's bark as to make it pretty dry, and then exposes the mixture, in a covered crucible, to the heat of a reverberatory furnace for half an hour. By lixiviation and crystallization, the mixture affords beautiful permanent crystals of carbonate of potass. In this state it consists of about 43 acid, 40 potass, and 17 water. The saturation with carbonic acid is one of the best means of purifying the sub-carbonate of potass; for it always separates silica from the uncombined alkali.

LIQUOR POTASSÆ SUB-CARBONATIS. *Lond.*

Solution of Sub-carbonate of Potass.

Take of
Sub-carbonate of potass, one pound;
Distilled water, twelve fluidounces.

Dissolve the sub-carbonate of potass in the water, and filter through paper.

AQUA SUB-CARBONATIS KALI. *Dub.*

Water of Sub-carbonate of Kali.

Take of
Sub-carbonate of kali, any quantity.

Place it in a wide glass funnel, whose throat is obstructed with a rag. Set this in a cellar, that the salt may deliquesce in the moist air. Let the solution be caught in a vessel placed under it.

The preparation of the Dublin college is the old *Oleum tartari per deliquium*, and is a solution of carbonate of potass in a variable quantity of water; for, by exposure to the air, the sub-carbonate attracts not only water, but carbonic acid. It is therefore improperly named. The name of the London college is correct, and the preparation nearly uniform in point of strength. Dr. Powell says, that the quantities ordered by the college will commonly give a solution amounting to nearly 18 ounces in bulk.

POTASSÆ SUPER-SULPHAS. *Lond.*

Super-sulphate of Potass.

Take of
The salt which remains after the distillation of nitric acid, two pounds,
Boiling water, four pints.

Mix, dissolve the salt, and filter. Then boil, until a pellicle be formed, and set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

THIS salt is acid to the taste, reddens vegetable blues, and effervesces with alkaline carbonates. It is directed by Lowitz tobe prepared by mixing seven parts of sulphuric acid with the same quantity of water in a large matrass, and adding to the hot mixture, as quickly as possible, four parts of potashes in fine powder. On cooling, the super-sulphate of potass shoots in fine large crystals, which are to be quickly washed in water and dried. This mode of directly preparing it is, however, unnecessary, as it is produced in sufficient quantity in the distillation of nitric acid. It was formerly called *Sal enixum* and *Tartarus vitriolatus acidus.* It is soluble in two waters at 60°, and less than one at 212°. It consists of 37 parts of sulphate of potass, and 33 sulphuric acid.

It is used in its unrefined state by silver-smiths, and is recommended by Lowitz for preparing acetic acid, by decomposing acetate of soda. It promises to be a valuable medicine, as enabling us to give sulphuric acid in combination with an aperient salt, and being less disagreeable and more soluble than the neutral sulphate.

AQUA SUPER-CARBONATIS POTASSÆ. *Ed.*

Solution of Super-carbonate of Potass.

Take of
Water, ten pounds;
Pure carbonate of potass, one ounce.

Dissolve and expose the solution to a stream of carbonic acid, arising from
Carbonate of lime in powder,
Sulphuric acid, each three ounces;
Water, three pounds, gradually and cautiously mixed.

The chemical apparatus invented by Dr. Nooth is well adapted for this preparation. But, if a larger quantity of the liquor be required, the apparatus of Dr. Woulfe is preferable.

The colder the air, and the greater the pressure, the better will the solution be, which must be kept in well corked vessels.

As soon as the preparation is finished, the liquor should be drawn off into pint bottles, which are to be well corked, and kept in a cool situation, with the head down, or laid on one side. It should be perfectly transparent, and have an acidulous, not at all alkaline taste; and, when poured out of the bottles, it should have a sparkling appearance.

Medical use.—In this solution, carbonate of potass is combined with excess of carbonic acid, by which means it is better adapted for internal use, as it is rendered not only more pleasant to the taste, but is less apt to offend the stomach. Indeed, it is the only form in which we can exhibit potass in sufficient doses, and for a sufficient length of time, to derive much benefit from its use in calculous complaints. It has certainly been frequently of advantage in these affections, but probably only in those instances in which the stone consists of uric acid, or urate of ammonia; for, although super-saturated with carbonic acid, yet the affinity of that acid for potass is so weak, that it really operates as an alkali.

Six or eight ounces may be taken two or three times a-day. It in general proves powerfully diuretic, and sometimes produces inebriation. This last effect is ascribed to the carbonic acid.

ACETIS POTASSÆ. *Ed.*

Acetite of Potass.

Take of

Pure carbonate of potass, one pound.

Boil it with a very gentle heat, in four or five times its weight of distilled acetous acid, and add more acid at different times, till, on the watery part of the preceding quantity being nearly dissipated by evaporation, the new addition of acid ceases to raise any effervescence, which will happen when about twenty pounds of acid have been consumed. It is then to be slowly dried. The impure salt remaining is to be melted with a gentle heat, for a short time, but no longer than necessary, and afterwards dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered liquor will be limpid; but if otherwise, of a brown colour. Afterwards evaporate this liquor with a very gentle heat, in a very shallow glass vessel, occasionally stirring the salt as it becomes dry, that its moisture may be sooner dissipated. Lastly, the acetite of potass ought to be kept in a vessel very closely stopped, to prevent it from deliquescing.

POTASSÆ ACETAS. *Lond.*
Acetate of Potass.

Take of
Sub-carbonate of potass, a pound and and a half;
Acetic acid, a gallon.

Mix them together in a large glass vessel, and having evaporated it over the fire to one half, add as much more acetic acid as may be sufficient to saturate the alkali completely. Evaporate again to one half, and filter. Then evaporate in the water-bath, so that, on being removed from the fire, it shall crystallize.

ACETAS KALI. *Dub.*
Acetate of Kali.

Take of
Sub-carbonate of kali, any quantity.

Add to it, at different times, about five times its weight of distilled vinegar, heated to a moderate temperature. When the effervescence shall have ceased, and the liquor is somewhat evaporated, add, at intervals, distilled vinegar, until the mixture shall entirely cease to effervesce; then evaporate to dryness; and having increased the fire a little, bring the saline mass cautiously into a state of fusion. Dissolve the salt, after it has cooled, in water: filter the solution, and evaporate, until, on cooling, it shall concrete into a crystalline mass, which should be very white. Put this, as quickly as possible, into vessels accurately closed.

THIS is both a troublesome and expensive preparation; for, when attempted to be made by simply evaporating to dryness, the salt has always a dark, unpleasant colour, which can neither be removed by repeated solution and crystallization, nor even by solution in alcohol. It is doubtful to what the colour is owing. It has been ascribed by some to part of the acetic acid being decomposed by heat during the exsiccation of the salt: they accordingly recommend the evaporation to be conducted very gently, and the pellicles to be skimmed from the surface of the liquor as fast as they are formed; and in this way, they say, they have procured, at once, a very white salt. Others ascribe it to some foreign matter, which rises in distillation with the last portions of the acetous acid, and therefore direct, that only the first portions which come over should be used, or that the acetous acid should be distilled with charcoal: while others again ascribe it to accidental impurities, contracted during the operation, and recommend the utmost attention to cleanliness, and the use of earthen vesels. To whatever cause it may be owing, and the second appears to us the most probable, the colour is most effectually destroyed by fusing the salt. The heat necessary to do this decomposes the colouring matter; and, on dissolving the fused mass in water, and filtering the solution, we find a fine light charcoal on the filter. But this fusion is attended with considerable loss; for part of the acetic acid itself is decomposed.

The operator must be particularly careful, in melting it, not to use a greater heat, nor keep it longer liquefied, than what is absolutely necessary: a little should be occasionally taken out, and put into water; and, as soon as it begins to part freely with its black colour, the whole is to be removed from the fire.

The exsiccation of the solution of the salt, after it has been fused, must be conducted very carefully, as it is exceedingly apt to be decomposed, which would render a new solution and exsiccation necessary. The test of its purity, by dissolving it in alcohol, as directed by the London college, is to discover if any of the acetic acid itself has been decomposed in the operation; for the carbonate of potass, which is in that case formed, is insoluble in alcohol.

To spare trouble and expence, attempts have been made to prepare acetate of potass with undistilled vinegar, and even with the residuum of the distillation of acetic acid: and they have been, to a certain degree, successful: but, as repeated fusion and crystallization are necessary to bring the salt to a certain degree of purity, it does not appear that they were more economical. But if, to acetate of potass, prepared with impure vinegar, we add a sufficient quantity of sulphuric acid, by distillation, we obtain an acetic acid of great strength, which forms a beautiful acetate of potass without fusion. Lastly, this salt may be prepared by the decomposition of acetates: for example, of the acetate of lime, by tartrate of potass.

Acetate of potass has a sharp, somewhat pungent taste. It is soluble at 60°, in about its own weight of water. It is also soluble in alcohol. It is deliquescent. It is decomposed by the stronger acids; by a decoction of tamarinds; by the sulphates of soda and of magnesia; by muriate of ammonia; by the tartrate of soda and potass; and by some metalline salts. Its acid is destroyed by a high temperature.

Medical use.—Acetate of potass, however prepared, provided it be properly made, is a medicine of great efficacy, and may be so dosed and managed, as to prove either mildly cathartic, or powerfully diuretic: few of the saline deobstruents equal it in virtue. The dose is from half a scruple to a drachm or two. A simple solution, however, of carbonate of potass in vinegar, without exsiccation, is perhaps not inferior, as a medicine, to the more expensive salt. Two drachms of the alkali, saturated with vinegar, have produced, in hydropic cases, ten or twelve stools, and a plentiful discharge of urine, without any inconnience.

SULPHAS POTASSÆ. *Ed.*

Sulphate of Potass; formerly *Vitriolated Tartar.*

Take of

Sulphuric acid, diluted with six times its weight of water, any quantity.

Put it into a capacious glass vessel, and gradually drop into it, pure carbonate of potass, dissolved in six times its weight of water, as much as is sufficient thoroughly to neutralize the acid. The effervescence being finished, strain the liquor through paper; and, after evaporation, set it aside to crystallize.

Sulphate of potass may be also conveniently prepared from the residuum of the distillation of nitrous acid, by dissolving it in warm water, and saturating it with carbonate of potass.

Lond.

Take of

The salt, which remains after the distillation of nitric acid, two pounds;

Boiling water, two gallons.

Mix them so as to dissolve the salt, and then add as much subcarbonate of potass as will saturate the excessive acid. Then boil to a pellicle, and, after filtration, set it aside to crystallize. Decant off the liquor, and dry the crystals on blotting paper.

SULPHAS KALI. *Dub.*

Sulphate of Kali.

Let the salt which remains after the distillation of nitrous acid, reduced to powder, be dissolved in a sufficient quantity of boiling water. Add as much potashes as will saturate the superfluous acid. Let the filtered liquor be evaporated with a very gentle heat, that it may crystallize.

THIS salt is very seldom prepared on purpose, as it may be obtained from the residuum of many other preparations, by simple solution and crystallization: for so strong is the affinity between sulphuric acid and potass, that they scarcely ever meet without combining to form this salt. All the sulphates, except that of baryta, are decomposed by potass and most of its combinations; and reciprocally, all the compounds of potass are decomposed by sulphuric acid and most of its combinations; and in all these decompositions, sulphate of potass is one of the products.

The greatest part of the sulphate of potass of commerce is obtained from the residuum of the distillation of sulphate of iron with nitrate of potass, by lixiviating it, super-saturating the solution with carbonate of potass, filtering it boiling hot, and allowing it to crystallize. The liquor remaining after the precipitation of magnesia, is also a solution of sulphate of potass. It is likewise got in considerable quantities from the residuum remaining in the retort, after the distillation of nitrous acid, and all the colleges have given directions for obtaining it, in this way, by simply saturating the excess of acid with sub-carbonate of potass.

As the residuum of the distillation of nitrous acid may not always be at hand, the Edinburgh college also give a receipt for making this salt, by directly combining its constituents. It would have been more economical to have used a solution of sulphate of iron, in place of sulphuric acid, by which means not only an equally pure sulphate of potass would have been procured, at less expence, but also a very pure carbonate of iron.

Sulphate of potass forms small, transparent, very hard crystals, generally aggregated in crusts, and permanent in the air. It has a bitter taste, is slowly soluble in water, requiring 16 waters at 60°, and 4 at 212°. It is not soluble in alcohol. It decrepitates when thrown on live coals, and melts in a red heat. It consists of 45.2 acid, and 54.8 potass. It is decomposed by the barytic salts; by the nitrates and muriates of lime and of strontia; by the tartrates partially; and by the salts of mercury, silver, and lead.

Medical use.—Sulphate of potass, in small doses, as a scruple, or half a drachm, is an useful aperient; in larger ones, as four or five drachms, a mild cathartic, which does not pass off so hastily as the sulphate of soda, and seems to extend its action further.

SULPHAS POTASSÆ CUM SULPHURE; olim, SAL POLYCHRESTUS. *Ed.*

Sulphate of Potass with sulphur; formerly *Polychrest Salt.*

Take of
- Nitrate of potass in powder;
- Sublimed sulphur, of each equal parts.

Mingle them well together, and inject the mixture, by little and little at a time, into a red-hot crucible: the deflagration being over, let the salt cool, after which it is to be put into a glass vessel well corked.

In this process the nitric acid of the nitrate of potass is decomposed by the sulphur, which is in part acidified. But the quantity of oxygen contained in the nitric acid, is not always sufficient to acidify the whole sulphur employed; therefore, part of it remains in the state of sulphureous acid, which is probably chemically combined with part of the potass in the state of sulphite; for the whole saline mass formed, is more soluble in water than sulphate of potass. It is crystallizable, and, by exposure to the air, gradually attracts oxygen, and is converted into sulphate, or perhaps super-sulphate of potass; for even when recently prepared, it is manifestly acid. But this preparation, like all those depending on the uncertain action of fire, is apt to vary. In some experiments which I made to determine the state in which the sulphur existed in this salt carefully prepared, it seemed to be sulphuric acid; for it neither gave out a sulphureous smell on the addition of sulphuric acid, nor was a solution of it precipitated by acids. In others the presence of sulphuretted hydrogen was obvious; but in no instance could sulphur, in any notable quantity, be detected. Hence its Edinburgh name, *Sulphas potassæ cum sulphure*, and the mode of preparation proposed, of simply triturating these substances together, are manifestly incorrect. In its medical effects and exhibition, it agrees with sulphureous mineral waters, which contain a proportion of neutral salt.

AQUA ALCALINA OXYMURIATICA. *Dub.*

Oxymuriatic Alkaline Water.

Take of
Dried muriate of soda, two pounds;
Manganese, in powder, one pound;
Water,
Sulphuric acid, each two pounds.

Put into a matrass the muriate of soda and manganese, mixed, and pour on the water; then, by means of a proper apparatus, add gradually, and at different times, the sulphuric acid, and let the gas evolved pass through a liquor, consisting of

Carbonate of kali, four ounces;
Water, twenty-nine ounces, by measure.

Towards the end of the operation, heat the matrass moderately. The specific gravity of this liquor is 1087.

THIS is a solution of the oxymuriate of potass; for the carbonate of potass in the receiver is decomposed by the oxymuriatic gas disengaged in the matrass, by the action of the sulphuric acid on the oxide of manganese and muriate of soda. A mixed sulphate of soda and manganese remains in the retort, while the oxygen and the muriatic acid, disengaged, unite in their nascent state, and form oxymuriatic acid, which escapes in the form of gas.

Medical use.—The oxymuriate of potass was, for a time, much extolled in the cure of syphilis; but it is now rarely, if at all, used. It was also recommended as an oxygenizing remedy, in typhus, scurvy, and other diseases, supposed to depend on a deficiency of oxygen in the system. It was recommended in doses of from five to fifteen grains, three times a-day; but even two hundred grains have been given daily, without much effect.

AQUA OXYMURIATICA. *Dub.*
Oxymuraitic Water.

This is prepared in a proper apparatus, by making the superfluous gas of the former operation pass through a pound of distilled water. Its specific gravity is 1003.

WATER absorbs a small portion of oxymuriatic gas; and the solution has been recommended in scarlatina. But, for the most important use of this singular acid, we must refer to what we have said under oxymuriatic acid.

TARTRIS POTASSÆ; olim, TARTARUM SOLUBILE. *Ed.*
Tartrite of Potass; formerly *Soluble Tartar.*

Take of
- Carbonate of potass, one pound;
- Super-tartrite of potass, three pounds, or as much as may be sufficient;
- Boiling water, fifteen pounds.

To the carbonate of potass, dissolved in the water, gradually add the super-tartrite of potass in fine powder, as long as it raises any effervescence, which generally ceases before three times the weight of the carbonate of potass has been added; then strain the cooled liquor through paper; and, after due evaporation, set it aside to crystallize.

POTASSÆ TARTRAS. *Lond.*
Tartrate of Potass.

Take of
- Sub-carbonate of potass, one pound;
- Super-tartrate of potass, three pounds;
- Boiling water, one gallon.

Dissolve the sub-carbonate of potass in the water, then add the super-tartrate of potass in powder, until it cease to excite effervescence. Filter the liquor through paper. Then evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

TARTRAS KALI. *Dub.*
Tartrate of Kali.

Take of
  Sub-carbonate of kali, one pound;
  Crystals of tartar, in very fine powder, two pounds and a half, or as much as will saturate the kali;
  Boiling water, a gallon.

Gradually add the tartar to the sub-carbonate of kali dissolved in the water; strain the liquor through paper, evaporate it, and let it crystallize by cooling.

THE tartaric acid is capable of uniting with potass in two proportions, forming in the one instance a neutral, and in the other an acidulous salt. The latter is an abundant production of nature; but it is easily converted into the former, by saturating it with potass, or by depriving it of its excess of acid. It is by the former method that the colleges direct tartrate of potass to be prepared; and the process is so simple, that it requires little comment. For the sake of economy, we should come as near the point of saturation as possible; but any slight deviation from it will not be attended with much inconvenience. Indeed, it is, perhaps, advisable to have a slight excess of acid, which, forming a small quantity of very insoluble salt, leaves the remainder perfectly neutral. The evaporation must be conducted in an earthen vessel, for iron discolours the salt. It is easily crystallized, and the crystals become moist in the air. It has an unpleasant bitter taste. It is soluble in four parts of cold water, and still more soluble in boiling water, and it is also soluble in alcohol. It is totally or partially decomposed by all acids. On this account it is improper to join it with tamarinds, or other acid fruits; which is too often done in the extemporaneous practice of those physicians who are fond of mixing different cathartics together, and know little of chemistry. It is also totally decomposed by lime, baryta, strontia, and magnesia, and partially by the sulphates of potass, soda, and magnesia, and by the muriate of ammonia.

Medical use.—In doses of a scruple, half a drachm, or a drachm, this salt is a mild, cooling aperient: two or three drachms commonly loosen the belly; and an ounce proves pretty strongly purgative. It has been particularly recommended as a purgative for maniacal and melancholic patients. It is an useful addition to the purgatives of the resinous kind, as it promotes their operation, and at the same time tends to correct their griping quality.

CARBONAS SODÆ. *Ed.*

Carbonate of Soda.

Take of

Impure carbonate of soda, any quantity.

Bruise it; then boil in water till all the salt be dissolved. Strain the solution through paper, and evaporate it in an iron vessel, so that after it has cooled, the salt may crystallize.

Dub.

Take of

Barilla, in powder, ten pounds;

Water, two gallons.

Boil the barilla in the water, in a covered vessel, for two hours, agitating it from time to time. Strain the liquor, and boil the barilla which remains, after triturating it again with an equal quantity of water. This may be repeated a third time. Evaporate the leys, filtered and mixed, in a wide iron vessel, to dryness, taking care that the saline mass remaining be not again liquefied by too great a degree of heat, and agitate it with an iron spatula, until its colour become white. Lastly, dissolve it in boiling water; and, after due evaporation, let it crystallize by slow refrigeration. The crystals will be purer, if, before each boiling, the barilla be exposed to the air for some time. It should be crystallized when the air is at the freezing temperature, and in a liquor whose specific gravity is 1220.

If the salt be not pure, repeat the solution and crystallization.

SODÆ SUB-CARBONAS. *Lond.*

Sub-carbonate of Soda.

Take of

Impure soda in powder, one pound;

Boiling distilled water, a gallon.

Boil the soda in the water for half an hour, and filter. Evaporate the solutions to two pounds, and set aside to crystallize. Throw away the residuary liquor.

THESE directions are principally intended for the purification of the Spanish barilla, which is a fused mass, consisting, indeed, principally of carbonate of soda, but also containing charcoal, earths, and other salts. The two first causes of impurity are easily removed by solution and filtration, and the salts may be separated by taking advantage of their different solubility in cold and in hot water. But the preparation of carbonate of soda, by the decomposition of sulphate of soda, has now become a manufacture, and is carried to such perfection, that its further purification is almost unnecessary for the purposes of the apothecary.

SODÆ SUB-CARBONAS EXSICCATA. *Lond.*

Dried Sub-carbonate of Soda.

Take of

Sub-carbonate of soda, one pound.

Apply a boiling heat to the sub-carbonate of soda in a clean iron vessel, until it be perfectly exsiccated, stirring it continually with an iron spatula. Lastly, reduce it to powder.

CARBONAS SODÆ SICCATUM. *Dub.*

Dried Carbonate of Soda.

Liquefy, over the fire, crystals of carbonate of soda, in a silver crucible, and then, increasing the heat, stir the liquefied salt, until, by the consumption of the water, it become dry.

Reduce it to fine powder, and keep it in close vessels.

SUB-CARBONATE of soda, deprived of its water of crystallization, is a very excellent remedy, for which we are indebted to Dr. Beddoes: he desires it to be prepared by simply exposing the pounded crystals before the fire; which appears to be preferable to the process directed by the colleges, in which much of the carbonic acid may be expelled. By simple efflorescence, crystallized carbonate of soda loses more than half its weight, and falls down into a fine permanent powder. Whenever soda is prescribed in the form of pills, the effloresced carbonate is to be used, as, when made of the crystallized salt, they crack, and fall to pieces by the action of the air upon them.

Medical use.—Dr. Beddoes first recommended the powder of effloresced soda, in calculous complaints, as a substitute for the super-carbonated alkaline waters, when these produced giddiness, or were too expensive; but its use has since been extended much farther; and it is found to be, not only an excellent antacid, but seems almost to possess specific virtues in affections of the urinary organs. One or two scruples may be given, in the course of the day, in the form of powder, or in pills, made up with soap and some aromatics.

SODÆ CARBONAS. *Lond.*

Carbonate of Soda.

Take of

Sub-carbonate of soda, one pound;
Sub-carbonate of ammonia, three ounces;
Distilled water, a pint.

Add the ammonia to the sub-carbonate of soda dissolved in the water; then apply a heat of 180°, in a sand-bath, for three hours, or until all the ammonia be expelled. Lastly, set it aside to crystallize.

In the same manner evaporate the residuary liquor, and set it aside again to crystallize.

This salt bears the same relation to the sub-carbonate that the carbonate of potass does to its sub-carbonate. Klaproth first described it, and says it consists of 39 carbonic acid, 38 soda, and 23 water. It is found native in hard striated masses, in the province of Sukena in Africa, and is called *Trona.*

AQUA SUPER-CARBONATIS SODÆ. *Ed.*

Water of Super-Carbonate of Soda.

This is prepared from ten pounds of water, and two ounces of carbonate of soda, in the same manner as the water of super-carbonate of potass.

By super-saturating soda with carbonic acid, it is rendered more agreeable to the palate, and may be taken in larger quantities, without affecting the stomach. This is now in common use as a cooling beverage, under the title of soda-water; and it may not be unnecessary to mention, that its place cannot be at all supplied by what is sold as soda powder, which is not a super-carbonate of soda, but merely a mixture of salts, which effervesces on being dissolved. Indeed, one moment's reflection must shew the impossibility of reducing to a solid form, a salt which cannot exist in solution, except under very great pressure.

PHOSPHAS SODÆ. *Ed.*

Phosphate of Soda.

Take of

Bones burnt to whiteness, and powdered, ten pounds;
Sulphuric acid, six pounds;
Water, nine pounds.

Mix the powder with the sulphuric acid in an earthen vessel; then add the water, and mix again: then place the vessel in a vapour bath, and digest for three days; after which, dilute the mass with nine pounds more of boiling water, and strain the liquor through a strong linen cloth, pouring over it boiling water, in small quantities at a time, until the whole acid be washed out. Set by the strained liquor, that the impurities may subside; decant the clear solution, and evaporate it to nine pounds. To this liquor, poured from the impurities, and heated in an earthen ware vessel, add carbonate of soda, dissolved in warm water, until the effervescence cease. Filter the neutralized liquor, and set it aside to crystallize. To the liquor that remains after the crystals are taken out, add a little carbonate of soda, if necessary, so as to saturate exactly the phosphoric acid; and dispose the liquor, by evaporation, to form crystals, as long as it will furnish any. Lastly, the crystals are to be kept in a well closed vessel.

Dub.

Take of
  Burnt bones, in powder, five pounds;
  Sulphuric acid, three pounds and a half, by weight.

Mix the powder, in an earthen vessel, with the sulphuric acid; gradually add five pints of water, and agitate the mixture; digest for three days, adding, from time to time, more water, to prevent the mass from becoming dry, and continue the agitation; then add five pints of boiling water, and strain through linen, pouring on boiling water repeatedly, until all the acid be washed out. Set aside the strained liquor until the fæces subside, from which pour it off; and reduce, by evaporation, to one half: then add, of carbonate of soda (dissolved in a sufficient quantity of warm water), three pounds ten ounces. Filter; and, by alternate evaporation and cooling, let it form crystals, which are to be kept in a well closed vessel.

If the salt be not sufficiently pure, dissolve and crystallize it again.

THE first part of this process consists in destroying the gelatine of the bones, by the action of heat. When burnt to perfect whiteness, they retain their form, but become friable, and consist of phosphate of lime, mixed with a very little carbonate of lime and carbonate of soda. In performing this part of the process, we must take care not to heat the bones to a bright red, as by it they undergo a kind of semi-fusion, and become less soluble. The complete combustion of the charcoal is facilitated by the free contact of the air: we must, therefore, bring every part, in succession, to the surface, and break the larger pieces.

In the second part of the process, the phosphate of lime is decomposed by the sulphuric acid. This decomposition is, however, only partial. The sulphuric acid combines with part of the lime, and forms insoluble sulphate of lime. The phosphoric acid, separated from that portion of lime, immediately combines with the rest of the phosphate of lime, and forms superphosphate of lime, which is not farther decomposable by sulphuric acid.

The super-phosphate of lime, thus formed, is soluble in water: but, as the sulphate of lime, with which it is mixed, concretes into a very solid mass, it is, in some measure, defended from the action of water. On this account, the whole mass is directed to be digested, for three days, in vapour, by which means it is thoroughly penetrated, and prepared for solution in the boiling water, which is afterwards poured on it. It is probably to render the subsequent solution easier, that Thenard directs the bone-ashes to be made into a thin paste (*bouille*) with water, before the sulphuric acid is added to them.

Having thus got a solution of super-phosphate of lime, it is next decomposed by carbonate of soda, dissolved in water. This decomposition, likewise, is only partial, as it deprives the super-phosphate of lime of its excess of acid only, and reduces it to the state of phosphate. The phosphate of lime, being insoluble, is easily separated by filtration, and the phosphate of soda remains in solution. According to Thenard, the nicest point in the whole process is the determination of the proper quantity of carbonate of soda to be added. As the phosphate of soda does not crystallize freely, unless there be a slight excess of base, he directs, that a little more carbonate of soda be added than what is merely sufficient to saturate the excess of acid in the super-phosphate of lime, but not to continue the addition until it cease to produce any precipitate. We must also take care not to carry the evaporation of a solution of phosphate of soda so far as to form a pellicle; for it then concretes into an irregular mass, and does not form beautiful crystals. After each crystallization, we must examine the liquor which remains, and, if it be acid, or merely neutral, add to it a little of the solution of carbonate of soda. In this way, Thenard got from 2100 parts of bone-ashes, 700 of sulphuric acid, and 667 of carbonate of soda, 885 of phosphate of soda. According to Fourcroy, phosphate of lime consists of 0.41 acid, and 0.59 lime, and super-phosphate of lime of 0.54 acid, and 0.46 lime: phosphate of lime, treated with sulphuric acid, is only deprived of 0.24 lime, and changed into 0.76 of super-phosphate, consisting of 0.59 phosphate of lime, and 0.17 phosphoric acid; and it is only with this portion of acid that we are able to combine soda. Fourcroy is also of opinion, that phosphate of lime requires only 0.4 of its weight of sulphuric acid to decompose it, whereas 0.6 are employed by the Edinburgh college, and 0.7 by the Dublin. This is not only, therefore, a waste of acid, but renders the product impure, by being mixed with sulphate of soda, which is sometimes actually the case in the phosphate of soda of commerce. Besides, as bone-ashes are of very little value, it is better that a portion of them should escape undecomposed, than that an excess of acid should be added to them.

Mr. Funcke, of Linz, has discovered a still more economical and expeditious method. It consists in saturating the excess of lime in calcined bones with diluted sulphuric acid, and then dissolving the remaining phosphate of lime in nitric acid. To this solution he adds an equal quantity of sulphate of soda, and then recovers the nitric acid by distillation. The phosphate of soda is then separated from the sulphate of lime, by the affusion of water and crystallization.

Phosphate of soda crystallizes in rhomboidal prisms, terminated by three-sided pyramids. Its taste resembles that of common salt. At 60° it is soluble in four parts of water, and at 212° in two. It effloresces in the air. By heat, it undergoes the watery fusion, and at lasts melts into a white mass. It consists, according to Thenard, of 15 phosphoric acid, 19 soda, and 66 water of crystallization. It is decomposed by most of the salts having an earthy base.

Medical use.—Phosphate of soda was introduced into the practice of physic by the ingenious Dr. George Pearson of London. It possesses the same medical qualities as sulphate of soda, and the tartrate of potass and soda, being an excellent purgative, in the quantity of an ounce or ten drachms; and has the peculiar advantage over these two salts, of being much less nauseous than they are. Its taste is extremely similar to that of common salt; and, when given in a bason of water-gruel, or veal-broth, made without salt, it is scarcely perceptible by the palate; and consequently it is well adapted for patients whose stomachs are delicate, and who have an antipathy against the other saline purges. The only objection to its general use is the very great difference between its price and that of sulphate of soda; a difference which might certainly be diminished.

MURIAS SODÆ SICCATUM. *Dub.*

Dried Muriate of Soda.

Take of
Muriate of soda, any quantity.
Roast it over the fire in an iron vessel, loosely covered, until it cease to decrepitate, agitating it from time to time.

By this process, the muriate of soda is reduced into the state in which it is employed for the distillation of muriatic acid. It not only deprives it entirely of its water of crystallization, which, from being variable in quantity, would otherwise render the acid obtained unequal in strength, but also destroys some colouring matter which it contains; for, if we prepare muriatic acid from crystallized muriate of soda, we obtain a coloured muriatic acid, while the dried muriate furnishes a perfectly colourless one.

SULPHAS SODÆ. *Ed.*

Sulphate of Soda.

Dissolve the acidulous salt, which remains after the distillation of muriatic acid, in water; and having mixed chalk with it, to remove the superfluous acid, set it aside until the sediment subsides; then evaporate the liquor decanted from them, and strain through paper, so that it may crystallize.

Lond.

Take of

The salt which remains after the distillation of muriatic acid, two pounds;

Boiling water, two pints and a half.

Dissolve the salt in the water, and gradually add as much subcarbonate of soda as will saturate the superfluous acid. Evaporate until a pellicle appear, and, after filtering the liquor, set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

Dub.

Dissolve the salt, which remains after the distillation of muriatic acid, in a sufficient quantity of boiling water. Evaporate the filtered solution, after due evaporation, and crystallize the salt by slow refrigeration.

THE Edinburgh college do not preserve the superabundant acid, when present, by saturating it with carbonate of soda, but get rid of it by saturating it with carbonate of lime, with which it forms an insoluble sulphate of lime. In fact, the price of sulphate of soda is so very small, that it is no economy to use carbonate of soda to saturate the superabundant acid.

By far the greatest part of the sulphate of soda is obtained from manufacturers, as a result of processes performed for the sake of other substances, as in the preparation of muriate of ammonia, oxygenized muriatic acid, &c. It may be economically obtained by making into a paste, with a sufficient quantity of water, eight parts of burnt gypsum, five of clay, and five of muriate of soda. This mixture is burnt in a kiln or oven, then ground to powder, diffused in a sufficient quantity of water, and, after being strained, is evaporated and crystallized.

Sulphate of soda crystallizes in six-sided prisms, terminated by dihedral summits. The crystals are often irregular, and their sides are usually channelled. Their taste is at first salt, and afterwards disagreeably bitter. They are soluble in 2.67 parts of water at 60°, and in 0.8 at 212°. In the air they effloresce. They undergo the watery fusion, and, in a red heat, melt. They consist of 23.52 sulphuric acid, 18.48 soda, and 58 water; and when dried at 700°, of 56 acid, and 44 soda. It is decomposed by baryta and potass, and salts containing these bases, and by the salts of silver, mercury, and lead.

Medical use.—Taken from half an ounce to an ounce, or more, it proves a mild and useful purgative; and, in smaller doses, largely diluted, a serviceable aperient and diuretic. It is commonly given in solution, but it may also be given in powder, after it has effloresced. In this form the dose must be reduced to one half.

TARTRIS POTASSÆ ET SODÆ; olim, SAL RUPELLENSIS. *Edin.*

Tartrite of Potass and Soda, formerly *Rochelle Salt.*

It is prepared from the carbonate of soda and super-tartrate of potass, in the same manner as the tartrate of potass.

TARTARAS SODÆ ET KALI. *Dub.*

Tartrate of Soda and Kali.

Take of
  Carbonate of soda, twenty ounces;
  Crystals of tartar, in very fine powder, two pounds;
  Distilled water, boiling, ten pints.

Dissolve the sub-carbonate of soda in the water, and gradually add the crystals of tartar; filter the liquor through paper; evaporate, and set it aside to crystallize by slow cooling.

SODA TARTARISATA. *Lond.*

Tartarized Soda.

Take of
  Subcarbonate of soda, twenty ounces;
  Supertartrate of potass in powder, two pounds;
  Boiling water, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the supertartrate of potass. Filter the solution through paper; evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

THE tartaric acid, in several instances, is capable of entering into combination, at the same time, with two bases. In the present example, the superabundant acid of the super-tartrate of potass is neutralized with soda, and, in place of a mixture of tartrate of potass and tartrate of soda, each possessing their own properties, there results a triple salt, having peculiar properties.

The tartrate of potass and soda forms large and very regular crystals, in the form of prisms with eight sides, nearly equal, which are often divided longitudinally, almost through their axis. It has a bitter taste. It is soluble in about five parts of water, and effloresces in the air. It is decomposed by the strong acids, which combine with the soda, and separate supertartrate of potass, and by baryta and lime. By heat its acid is destroyed. It consists of 54 tartrate of potass, and 46 tartrate of soda.

Medical use.—It was introduced into medical practice by M. Seignette, an apothecary at Rochelle, whose name it long bore.

It is still frequently employed; and though less agreeable than the phosphate of soda, it is much more so than the sulphate of soda. It is less purgative than these, and must be given in larger doses.

AQUA AMMONIÆ, olim AQUA AMMONIÆ CAUSTICÆ. *Ed.*
Water of Ammonia, formerly *Water of Caustic Ammonia.*

Take of
  Muriate of ammonia, one pound;
  Quicklime, fresh burnt, one pound and an half;
  Distilled water, one pound;
  Water, nine ounces.

Pour the water on the powdered lime, contained in an iron or earthen vessel, which is then to be covered up until the lime falls to powder. Then mix the muriate, previously ground into very fine powder, thoroughly with the lime, by triturating them together in a mortar, and immediately put the mixture into a retort of bottle glass. Place the retort in a sand bath, and connect with it a Woulfe's apparatus. In the first and smallest bottle, furnished with a tube of safety, put two ounces of the distilled water, and in the second the rest of the distilled water.

The fire is now to be kindled, and gradually increased, until the bottom of the sand pot becomes red. Mix the fluid contained in each of the bottles, and preserve it in small phials, accurately closed.

AQUA AMMONIÆ CAUSTICÆ. *Dub.*
Water of Caustic Ammonia.

Take of
  Muriate of ammonia, sixteen ounces;
  Lime, fresh burnt, two pounds;
  Water, six pints.

Sprinkle one pint of the water upon the lime, placed in a stoneware vessel, and cover it up. Twenty-four hours afterwards, mix the salt with the lime, which will have crumbled to powder, taking care to avoid the vapours. Then put the mixture into a retort, and pour upon it the rest of the water. Having previously agitated them, draw off, with a moderate heat, twenty ounces, by measure, of liquor, into a refrigerated receiver, having luted carefully the joining of the vessels.

The specific gravity of this liquor is to that of distilled water, as 936 to 1000.

LIQUOR AMMONIÆ. *Lond.*
Liquor of Ammonia.

Take of
Muriate of ammonia,
Fresh lime, of each, two pounds;
Water, a pint and a half.

Triturate the muriate of ammonia and lime separately; then mix and introduce them into a large glass retort, into which a pint of water has been previously put. Place the retort in a sand bath, and adapt to it a tubulated receiver, through which the ammonia may pass into a third vessel, kept cold, and containing eight fluidounces of water. Lastly, apply at first a gentle heat, and gradually increase it until the retort become red.

THE Edinburgh and Dublin colleges slake the lime before it be mixed with the muriate of ammonia, in order that the heat generated during the slaking, may not decompose the muriate when they are previously mixed.

The London college does not direct the lime to be slaked, previously to its being mixed with the muriate of ammonia, conceiving, probably, that the heat generated during the slaking of the lime, is counteracted by the cold produced by the solution of the muriate. If not, there must be a great loss of ammonia by the decomposition beginning before the apparatus can be adapted. At any rate, there can be no disadvantage in first slaking the lime, especially as it is the easiest way of reducing it to fine powder. The mixture of the lime and salt must be made very quickly, by stirring rather than trituration, and the process begun as quickly as possible.

In this process, the muriate of ammonia is decomposed by the lime, in consequence of its having a stronger affinity for muriatic acid than ammonia has. It is absolutely necessary that the lime employed be very recently burnt, as the presence of carbonic acid would render the ammonia partially carbonated. This accident is also prevented by the great excess of lime used, which, having a greater affinity for carbonic acid than ammonia has, retains any small quantity of it which may be accidentally present. The water is essential to the existence of the ammonia in a liquid form; for, in itself, it is a permanently elastic fluid. In the process adopted by the Dublin college, a much greater quantity of water, however, is used than what is sufficient to absorb all the ammonia: the rest is intended to render the decomposition slower and more manageable, and to keep the muriate of lime, which remains in the retort, in solution; for, otherwise, it would concrete into a solid mass, adhering strongly to the bottom of the retort, very difficult to be washed out, and often endangering its breaking. A very small degree of heat is sufficient for the distillation, and the whole ammonia rises with the first portion of water, or even before it. It is, therefore, necessary that the vessels be very closely luted to each other, to prevent it from escaping. But this renders the utmost care necessary in the distillation; for too sudden, or too great a heat, from the rapid disengagement of gas, or even the expansion of the air contained in the vessels, would endanger their bursting.

In the process directed in the Edinburgh and London Pharmacopœias, this danger is completely obviated, by disengaging the ammonia in the form of gas, and combining it with the water, by means of pressure in a pneumatic apparatus. By this process, the water should be saturated with ammonia; but of this strength it is never sold in the shops, unless particularly inquired for, as, for common sale, it is always diluted with a certain proportion of water.

We have already mentioned the properties of ammonia in its gaseous form. When combined with water, it imparts to it many of these properties, and lessens its specific gravity. Liquid ammonia, or water saturated with ammonia, contains 74.63 water, and 25.37 ammonia; and its specific gravity is 0.9054. When it has the specific gravity mentioned by the Dublin college, 0.936, it contains about 83 of water, and 17 of ammonia. It assumes its elastic form, and separates from the water, when heated to about 130°, and quickly attracts carbonic acid from the atmosphere. It decomposes many of the earthy, and all the metalline salts, and is capable of dissolving, or combining with, many of the metalline oxides, and even of oxydizing some of the metals. When pure, water of ammonia does not effervesce with any of the acids, or form a precipitate with alcohol. As it readily absorbs carbonic acid from the atmosphere, the Edinburgh college, very properly, order it to be kept in small phials. By neglecting this precaution in the shops, it often becomes carbonated before the large bottles, in which it is commonly kept, be half done.

Medical use.—Water of ammonia is very rarely given internally, although it may be used in doses of ten to twenty drops, largely diluted, as a powerful stimulant in asphyxia, and similar diseases. Externally, it is applied to the skin as a rubefacient, and, in the form of gas, to the nostrils, and to the eyes, as a stimulant; in cases of torpor, paralysis, rheumatism, syncope, hysteria, and chronic ophthalmia.

ALCOHOL AMMONIATUM, olim SPIRITUS AMMONIÆ. *Edin.*

Ammoniated Alcohol, formerly *Spirit of Ammonia.*

Take of
- Alcohol, thirty-two ounces;
- Quicklime, recently burnt, twelve ounces;
- Muriate of ammonia, eight ounces;
- Water, eight ounces.

From these ingredients Ammoniated Alcohol is prepared, exactly in the same manner as the water of ammonia.

SPIRITUS AMMONIÆ. *Dub.*

Spirit of Ammonia.

Take of
- Proof spirit, three pints;
- Muriate of ammonia, four ounces;
- Potashes, six ounces.

Mix, and distil, with a slow fire, two pints.

Lond.

Take of
- Rectified spirit, two pints;
- Liquor of ammonia, one pint.

Mix them.

WHEN muriate of ammonia is decomposed by carbonate of potass, the product is a mixture of carbonate of ammonia with a variable quantity of ammonia; for the carbonate of potass is never saturated with carbonic acid. Again, as diluted alcohol is employed in this process, and one half only is drawn off, it is evident, that there is either a want of economy, or the whole alcohol comes over before any of the water. But if the latter supposition be true, there is also a want of economy, for the alcohol will dissolve only the ammonia, and leave the whole carbonate undissolved. The fact is, that when we perform the process as still retained by the Dublin college, a very large proportion of carbonate of ammonia sublimes, which remains undissolved in the distilled liquor; but as this liquor (after the particles of carbonate of ammonia, which were diffused through it, have separated in the form of very regular crystals, adhering to the sides of the vessel) effervesces with acids, the distilled liquor cannot be pure alcohol, but must contain a proportion of water capable of dissolving some carbonate of ammonia.

But, to prove the want of chemical knowledge in the contrivers of this process, it is only necessary to mention, that the product is unfit for the preparation of the aromatic ammoniated alcohol, as it will not dissolve the volatile oils.

The process now, for the first time, directed by the Edinburgh college, is, therefore, infinitely preferable, as it is not only more elegant, but more economical, and dissolves the volatile oils perfectly.

The Berlin college direct this preparation to be made by simply mixing two parts of alcohol with one of water of ammonia; and the London college have substituted this process for the unchemical one in their former edition.

CARBONAS AMMONIÆ, olim AMMONIA PRÆPARATA. *Edin:*

Carbonate of Ammonia, formerly *Prepared Ammonia.*

Take of
- Muriate of ammonia, one pound;
- Pure carbonate of lime (commonly called chalk), dried, two pounds.

Having triturated them separately, mix them thoroughly, and sublime from a retort into a refrigerated receiver.

Dub.

Take of
- Muriate of ammonia, in powder, and well dried,
- Dried carbonate of soda, of each half a pound.

Mix them, put them into an earthen retort, and sublime, with a heat gradually raised, into a cooled receiver.

AMMONIÆ CARBONAS. *Lond.*

Prepared Ammonia.

Take of
- Muriate of ammonia, one pound;
- Prepared chalk, dried, two pounds.

Triturate them separately, then mix and sublime them with a gradually increased heat, until the retort become red.

In this process the two substances employed undergo a mutual decomposition, the muriatic acid combining with the lime or the soda, and the carbonic acid with the ammonia. The proportion of carbonate of lime directed by the Edinburgh and London colleges, is perhaps more than sufficient to decompose the muriate of ammonia; but it is the safe side to err on; for it is only sometimes inconvenient, from obliging us to make use of larger vessels, whereas, if any portion of the muriate of ammonia were to remain undecomposed, it would sublime along with the carbonate, and render the product impure. Gottling uses three parts of chalk to two of muriate of ammonia, but he dries his chalk before he weighs it. The chalk is always to be very carefully dried before it is used in this preparation, as the presence of moisture injures the product. The ingredients are to be thoroughly mixed by trituration, before they are introduced into the retort, that no part of the muriate of ammonia may escape decomposition; and we are even sometimes directed to cover the surface of the mixture, after they are in the retort, with powdered chalk. This, however, is unnecessary. Carbonate of lime does not act on muriate of ammonia till a considerable heat be applied. Gottling says, that the sublimation must be conducted in the open fire, and therefore he uses an earthen-ware cucurbit, with a tubulated capital. When a glass retort is employed, it should have a very wide neck; and the best form for the receiver is cylindrical, as it enables us to get out the carbonate of ammonia condensed in it without breaking it. The residuum which remains in the retort furnishes muriate of lime by lixiviation and evaporation.

By the Dublin college, carbonate of soda is employed for the preparation of carbonate of ammonia. The theory of the process is the same, and the decomposition is effected at a lower temperature. But as soda is very rarely saturated with carbonic acid, part of the ammonia is evolved in the form of gas, which, if not permitted to escape, will burst the vessels. To prevent this loss, therefore, Mr. Gottling uses a cucurbit and capital, furnished with a bent tube, which is to be immersed in a phial of water: by which contrivance, while the carbonate of ammonia is condensed in the capital, the gaseous ammonia is absorbed by the water. When soda is used, the residuum contains muriate of soda.

Carbonate of ammonia is obtained in the form of a white crystallized mass, of a fibrous texture, having the smell and taste of ammonia, but weaker. It is soluble in twice its weight of cold water, and is more soluble as the temperature of the water increases; but when it approaches to a boiling heat, the carbonate is volatilized. It is insoluble in alcohol. It is permanent in the air, and is not decomposed, but is easily vaporized by heat. It is said to vary very much in its composition, and to contain more ammonia, and less acid and water, in proportion to the high temperature employed in preparing it, the quantity of alkali varying from 50 to 20 *per cent.* It is decomposed by most of the acids, and all the alkaline, and some of the earthy bases; by the earthy sulphates, except those of baryta and strontia; by the earthy muriates, and fluates; by the nitrates of baryta, and super-phosphate of lime.

Medical use.—Carbonate of ammonia exactly resembles ammonia in its action on the living body; but is weaker, and is principally used as smelling salts in syncope and hysteria.

AQUA CARBONATIS AMMONIÆ, olim AQUA AMMONIÆ. *Ed.*

Water of Carbonate of Ammonia, ſormerly *Water of Ammonia.*

Take of
 Muriate of ammonia,
 Carbonate of potass, each sixteen ounces;
 Water, two pounds;
Having mixed the salts, and put them in a glass retort, pour the water upon them, and distil to dryness in a sand bath, gradually increasing the heat.

Dub.

Take of
 Muriate of ammonia, one pound;
 Carbonate of soda, twenty-eight ounces;
 Water, three pints.
Distil off by heat, gradually raised, two pounds by measure.
The specific gravity of this liquor is 1095.

LIQUOR AMMONIÆ CARBONATIS. *Lond.*

Liquor of Carbonate of Ammonia.

Take of
 Carbonate of ammonia, eight ounces;
 Distilled water, a pint.
Dissolve the carbonate of ammonia in the water, and filter through paper.

THE nature of the last of these preparations is evident; and from its being more simple and uniform, it is preferable to the former, for which it is a substitute, as the product in that case is also a solution of carbonate of ammonia, while the residuum in the retort is an alkaline muriate. In this instance, the decomposition of the muriate of ammonia cannot be effected by carbonate of lime, because the addition of the water prevents the application of the necessary heat, whereas alkaline carbonates act at a moderate temperature.

LIQUOR VOLATILIS CORNU CERVINI. *Dub.*

Volatile Liquor of Harts-horn.

Take of
 Harts-horn, any quantity.
Put it into a retort, and distil, with a gradually increased heat, the volatile liquor, salt, and oil. Then repeat the distillation

of the volatile liquor until it becomes as limpid as water, separating by filtration the oil and salt after each distillation. The liquor will be more easily purified, if, after each distillation, except the first, there be added about a sixth part of its weight of charcoal of wood previously heated to redness, then extinguished, by covering it with sand, and powdered while it is hot.

If harts-horn cannot be had, the bones of any other land animal may be substituted for them.

THE wholesale dealers have very large pots for this distillation, with earthen heads, almost like those of the common still; for receivers, they use a couple of oil jars, the mouths of which are luted together; the pipe that comes from the head is connected by means of an adopter with the lower jar, which is also furnished with a cock for drawing off the fluids condensed in it. The upper jar is entire, and in it is condensed the solid carbonate of ammonia. When a large quantity of the subject is to be distilled, it is customary to continue the operation for several days successively; only unluting the head occasionally, to put in fresh materials. When the upper jar becomes entirely filled with carbonate of ammonia, it cracks. It is then to be removed, the salt to be taken out of it, and a fresh one substituted in its place.

When only a small quantity of spirit or salt is wanted, a common iron pot, such as is usually fixed in sand furnaces, may be employed, an iron head being fitted to it. The receiver ought to be large, and a glass, or rather tin, adopter inserted between it and the head of the pot.

The distilling vessel being charged with pieces of horn, a moderate fire is applied, which is slowly increased, and raised at length almost to the utmost degree. At first water arises, which gradually acquires colour and smell, from the admixture of empyreumatic oil and ammoniacal salts; carbonate of ammonia next arises, which at first dissolves, as it comes over, in the water, and thus forms what is called the *spirit*. When the water is saturated, the remainder of the salt concretes in a solid form to the sides of the recipient. If it be required to have the whole of the salt solid, and undissolved, the water should be removed as soon as the salt begins to arise, which may be known by the appearance of white fumes; and that this may be done the more commodiously, the receiver should be left unluted, till this first part of the process be finished. The white vapours, which now arise, sometimes come over with such vehemence as to throw off or burst the receiver; to prevent this accident, it is convenient to have a small hole in the luting, which may be occasionally stopt with a wooden peg, or opened, as the operator shall find proper. Lastly, the oil arises, which acquires greater colour and consistency as the operation advances. Carbonate of ammonia still comes over, but it is partly dissolved in the hot oily vapour. At the same time, there is a considerable disengagement of gas, consisting of a mixture of carburetted hydrogen, often containing sulphur and phosphorus, and of carbonic acid.

All the liquid matters being poured out of the receiver, the salt, which remains adhering to its sides, is to be washed out with a little water, and added to the rest. It is convenient to let the whole stand for a few hours, that the oil may the better disengage itself from the liquor, so as to be first separated by a funnel, and afterwards more perfectly, by filtration through wet paper.

None of these products, except perhaps a small quantity of the carbonic acid, exist ready formed in the matter subjected to the distillation, but are produced by a new arrangement of its constituents. For the production of ammonia, it is absolutely necessary that it contain nitrogen, or be what we have called a quaternary oxide. Although some vegetable, and most animal, substances are of this kind, yet only the most solid parts of animals, such as bone or horn, are employed for the production of ammonia; because they furnish it less mixed with other substances, are easily obtained, and at little expence, and are very manageable in the distillation. On the application of heat, as soon as all the water which they contained is expelled, their elements begin to act on each other, and to form binary, or at most ternary compounds. Water is formed of part of the oxygen and hydrogen, ammonia of nitrogen and hydrogen, carbonic acid of carbon and oxygen, then oil of hydrogen and carbon, while the superfluous carbon remains in the retort in the state of charcoal. As the formation of these substances is simultaneous, or in immediate succession, they are not obtained separately, but are mixed with each other. The water is saturated with carbonate of ammonia, and impregnated with empyreumatic oil, while the carbonate of ammonia is discoloured with oil; and the oil contains carbonate of ammonia dissolved in it. They may, however, be separated from each other, in a great measure, in the manner already described. But a small portion of oil obstinately adheres both to the salt and its solution, which constitutes the only difference between salt and spirit of harts-horn, as they are called, and the purer carbonate of ammonia, as obtained by the decomposition of muriate of ammonia.

AQUA ACETITIS AMMONIÆ, vulgo SPIRITUS MINDERERI. *Ed.*

Water of Acetite of Ammonia, commonly called *Spirit of Mindererus.*

Take of

Carbonate of ammonia in powder, any quantity.

Pour upon it as much distilled acetous acid as may be sufficient to saturate the ammonia exactly.

AQUA ACETATIS AMMONIÆ. *Dub.*

Water of Acetate of Ammonia.

Take of

Carbonate of ammonia, two ounces.

Add gradually, with frequent agitation, three pounds and a half of distilled vinegar, or as much as will saturate the ammonia, as proved by the test of lithmus.

LIQUOR AMMONIÆ ACETATIS. *Lond.*

Solution of Acetate of Ammonia.

Take of

Carbonate of ammonia, two ounces;

Acetic acid, four pints.

Add the acid to the carbonate of ammonia until the effervescence cease, and mix.

BY this process we obtain acetate of ammonia, dissolved in the water of the acetic acid: but as this is apt to vary in quantity, the solution also varies in strength, and the crystallization of the salt is attended with too much difficulty to be practised for pharmaceutical purposes. Its crystals are long, slender, and flatted, of a pearly white colour, and of a cool sweetish taste, are very deliquescent, melt at 170°, and sublime at 250°. It is decomposed by the acids, alkalies, and several of the earths, and metalline salts; and when in solution, its acid is decomposed spontaneously, and by heat.

Different proposals have been made to get a solution of greater strength and uniformity than that still retained by the British colleges. Mr. Lowe saturates four ounces of carbonate of potass with distilled vinegar, and evaporates the solution to 36 ounces. He then mixes it with two ounces of muriate of ammonia, and distils the mixture in a glass retort. Acetate of ammonia comes over. The last edition of the Prussian Pharmacopœia prepares it by saturating three ounces of carbonate of ammonia with a strong acetic acid (obtained by distillation from acetate of soda, dissolved in two parts of water, and decomposed by sulphuric acid), and diluting the solution with water, so that it shall weigh twenty-four ounces. One ounce, therefore, contains the alkali of a drachm of carbonate of ammonia

Medical use.—Acetate of ammonia, when assisted by a warm regimen, proves an excellent and powerful sudorific; and as it operates without quickening the circulation, or increasing the heat of the body, it is admissible in febrile and inflammatory diseases, in which the use of stimulating sudorifics are attended with danger. Its action may likewise be determined to the kidneys, by walking about in a cool air. The common dose is half an ounce, either by itself, or in combination with other substances.

CHAP. IV.—EARTHS, AND EARTHY SALTS.

MURIAS BARYTÆ. *Edin.*

Muriate of Baryta.

Take of
  Carbonate of baryta,
  Muriatic acid, one part;
  Water, three parts.

Add the carbonate, broken into little bits, to the water and acid, previously mixed. After the effervescence has ceased, digest for an hour, strain the liquor, and set it aside to crystallize. Repeat the evaporation as long as any crystals are formed.

If the carbonate of baryta cannot be procured, the muriate may be prepared in the following manner from the sulphate.

Take of
  Sulphate of baryta, two pounds;
  Charcoal of wood, in powder, four ounces.

Roast the sulphate, that it may be more easily reduced to a very fine powder, with which the charcoal is to be intimately mixed. Put the mixture into a crucible, and having fitted it with a cover, heat it with a strong fire for six hours. Then triturate the matter well, and throw it into six pounds of water in an earthen or glass vessel, and mix them by agitation, preventing as much as possible the action of the air.

Let the vessel stand in a vapour bath until the part not dissolved shall subside, then pour off the liquor. On the undissolved part pour four pounds more of boiling water, which, after agitation and deposition, are to be added to the former liquor. Into the liquor, when still warm, or if it shall have cooled, again heated, drop muriatic acid as long as it excites any effervescence. Then strain it, and evaporate it so as to crystallize

In the materia medica of the Edinburgh college, the carbonate of baryta is introduced, for the purpose of forming the muriate; but as that mineral is not very common, and sometimes not to be procured, it became necessary to describe the manner of preparing the muriate from the sulphate. This is, however, attended with very considerable difficulties, on account of the very strong attraction which subsists between the sulphuric acid and baryta.

The sulphate of baryta may be decomposed,

1. By compound affinity, by means of carbonate of potass or muriate of lime.

Carbonate of potass is capable of effecting this decomposition, either in the dry or humid way. Klaproth boils sixteen ounces of finely powdered sulphate of baryta with 32 ounces of purified carbonate of potass, and five pounds of water, for an hour in a tin kettle, constantly agitating the mixture, and renewing the water as it evaporates. He then allows it to settle, pours off the fluid, which is a solution of sulphate of potass, and edulcorates the precipitate with plenty of water. He next dissolves the carbonate of baryta, which it contains, in muriatic acid. The portion of sulphate which is not decomposed, may be treated again in the same manner.

On the other hand, Van Mons mixes equal parts of sulphate of baryta and carbonate of potass with one fourth of their weight of charcoal, all in powder, and heats the mixture to redness in a crucible. When it cools, he washes out the sulphate and sulphuret of potass with water, then boils the residuum with a little potass, and washes it again. The carbonate of baryta thus obtained he dissolves in muriatic acid.

But by these methods of decomposing the sulphate of baryta, we do not get rid of the metallic substances which it often contains, and render the muriate thus prepared unfit for medical use. The metalline muriates may, however, be expelled, according to Westrumb, by heating the salt to redness as long as any fumes arise. The pure muriate of baryta is then to be dissolved in water, and crystallized. Gottling, with the same intention, of getting rid of metalline substances, chooses sulphate of baryta, perfectly colourless, and treats it with muriatic or nitro-muriatic acid before he proceeds to decompose it.

La Grange has proposed a new method of decomposing the sulphate of baryta, by means of muriate of lime, which he prepares from the residuum of the decomposition of muriate of ammonia by lime, by dissolving it in a small quantity of hot water, and evaporating it to dryness. He mixes equal parts of this muriate with sulphate of baryta in powder, and projects it by spoonfuls into a crucible previously heated to redness. When it is all in complete fusion, he pours it out upon a polished stone previously heated. The matter, which cracks as it cools, has a whitish-grey colour, and is very hard, sonorous, and deliquescent, is now to be boiled in about six times its weight of distilled water, its solution filtered, and the residuum boiled in a smaller quantity of water. The mixed solutions are then evaporated to a pellicle, and on cooling furnish beautiful crystals of muriate of baryta, which are to be washed with cold water, and purified by a second solution and crystallization. The mother water of the first crystallization still contains muriate of baryta, which may be separated from the muriate of lime, with which it is mixed, by repeated solutions and crystallizations. La Grange thinks that this process not only saves time, fuel, and muriatic acid, but that it furnishes a purer muriate of baryta than the following process.

2. By decomposing its acid, by means of charcoal.

The acid of the sulphate of baryta is decomposed at a very high temperature by charcoal. At such a temperature charcoal has a greater affinity for oxygen than sulphur has; it therefore decomposes sulphuric acid, by depriving it of its oxygen, and flies off in the state of carbonic oxide or acid gas, while the sulphur combines with the baryta. On adding water to the sulphuret thus formed, new combinations take place. A portion of sulphate of baryta is regenerated, while hydroguretted sulphuret, and sulphuretted hydroguret of baryta, remain in solution. This solution is exceedingly prone to decomposition, and must, therefore, be preserved from the action of the air as much as possible. It also crystallizes by cooling, and therefore should be kept at a boiling heat. On the addition of muriatic acid, there is a violent effervescence and disengagement of sulphuretted hydrogen gas, which must be avoided as much as possible, by performing the operation under a chimney, while very pure muriate of baryta remains in solution. When prepared in this way, it cannot be contaminated with any of the noxious metals, as their compounds with sulphur and hydrogen are not soluble. On this account, therefore, it is the process adopted by the Edinburgh college.

Muriate of baryta commonly crystallizes in tables. It has a disagreeable bitter taste; is soluble in three parts of water at 60°, and in less boiling water. It is scarcely soluble in alcohol; and its solution burns with a yellow flame. It crystallizes by evaporation; its crystals are permanent; and by the action of heat decrepitate, dry, and melt. When crystallized, it contains 20 acid, 64 baryta, and 16 water; when dried, 23.8 acid, and 76.2 baryta. It is decomposed by the sulphates, nitrates, and sulphites; and by the alkaline phosphates, borates, and carbonates. When pure it has no colour; does not deliquesce; does not burn with a red or purple flame, when dissolved in alcohol; and is not precipitated by gallic acid, prussiate of potass and iron, or hydro-sulphuret of ammonia. By washing with alcohol muriate of baryta, rendered impure by the presence of muriate of iron, the latter alone is dissolved.

It is commonly given in solution.

SOLUTIO MURIATIS BARYTÆ *Ed.*

Solution of Muriate of Baryta.

Take of
Muriate of baryta, one part;
Distilled water, three parts. Dissolve.

THE proportion of water directed here for the solution of muriate of baryta, is considerably less than what is stated to be necessary by the writers on chemistry. It is, however, sufficient, even at the lowest ordinary temperatures; a circumstance which should be attended to in making saturated solutions of saline bodies.

Medical use.—Muriate of baryta is generally said, by writers on the materia medica, to be a *stimulant* deobstruent; and yet Hufeland, one of its greatest supporters, says, that it succeeds better in cases attended with inflammation and increased irritability than with atony and torpor. When given in large doses, it certainly produces nausea, vomiting, diarrhœa, vertigo, and death.

Its effects on a morbid state of the body are also disputed. Some assert that it is of advantage in no disease; while others bestow upon it the most unqualified praises. By the latter, it is principally celebrated,

1. In all cases of scrofula;
2. In obstructions and tumors;
3. In cases of worms;
4. In cutaneous diseases.

The dose of the solution, at first, is five or ten drops twice or thrice a-day, to be gradually and cautiously increased to as much as the patient can bear.

The solution is also used externally as a stimulating and gently escharotic application in cutaneous diseases, fungous ulcers, and specks upon the cornea.

CALX. *Lond.*

Lime.

Take of

Lime-stone, one pound.

Break it into bits, and burn it for an hour in a crucible with a violent heat, or until the carbonic acid be totally expelled, so that on dropping on it acetic acid, no air bubbles are formed.

Lime may be made in the same manner from *oyster shells*, after they have been washed in boiling water, and freed from all impurities.

Lime is not found in nature, but it is easily procured by the action of fire from any of the abundant carbonates, mineral or animal. For some purposes common lime will do; but as it is seldom totally deprived of its carbonic acid, it may be necessary for the apothecary to prepare it himself. Clean oyster-shells afford it in the greatest purity; and as pure lime is not altered by any heat that can be applied, there is no risk of pushing the fire too far. Marble, and many lime-stones, also furnish a very pure lime; but those which contain a mixture of other earths, are apt to become vitrified on the surface, which prevents them from slaking.

AQUA CALCIS. *Ed.*

Lime Water.

Take of

Fresh burnt lime, half a pound.

Put it into an earthen vessel, and gradually sprinkle on it four ounces of water, keeping the vessel shut, while the lime grows hot, and falls into powder. Then pour on it twelve pounds of water, and mix the lime thoroughly with the water by agitation. After the lime has subsided, repeat the agitation; and let this be done about ten times, always keeping the vessel shut, that the free access of the air may be prevented. Lastly, let the water be filtered through paper, placed in a funnel, with glass rods interposed between them, that the water may pass as quickly as possible. It must be kept in very close bottles.

Dub.

Take of

Lime, recently burnt, one pound;

Boiling water, one pint.

Put the lime into an earthen vessel, and sprinkle the water upon it, keeping the vessel shut while the lime grows warm and falls into powder; then pour upon it three gallons of cold water, and shut the vessel, agitating it frequently for twenty-four hours; lastly, filter the water through paper, placed in a covered funnel, and keep it in well-closed bottles.

Liquor Calcis. *Lond.*
Solution of Lime.

Take of
Lime, half a pound;
Boiling distilled water, twelve pints.

Pour the water on the lime, and stir them together; immediately cover the vessel, and set it aside for three hours; then preserve the liquor upon the remaining lime in well washed bottles, and decant off the limpid solution when wanted for use.

We have already had occasion to speak of the properties of lime, and shall therefore now confine our remarks to the solution of it in water, commonly called Lime-water. In making this, we should first add only so much water as is sufficient to slake the lime, which reduces it to a fine powder, easily diffused through water; for if we add more water at first, it forms a paste with the external part of the lime, and defends the internal from the action of the water. During the whole process, the air must be excluded as much as possible; as lime has a very strong affinity for carbonic acid, and attracts it from the atmosphere. The proportion of water used is scarcely able to dissolve one tenth of the lime; but lime is of little value; and our object is to form a saturated solution quickly and easily. Lime is not more soluble in hot water than in cold: therefore, it is unnecessary to use boiling water. The Edinburgh and Dublin colleges filter their solutions; and if we use the precautions directed, it may be performed without the lime absorbing a perceptible quantity of carbonic acid. The bottles in which lime-water is kept, should be perfectly full, and well corked.

The London college do not filter, but decant off their solution, and if carefully performed it will be perfectly pure; and the direction given by them, in their last edition, of keeping their lime-water upon an excess of lime, is certainly an advantage, as we are sure of its being always saturated, for fresh lime will be always dissolved to supply the place of that rendered insoluble, and precipitated by the absorption of carbonic acid.

Lime-water is transparent and colourless. It has an austere acrid taste, and affects vegetable colours as the alkalies do. It enters very readily into combination with all the acids, sulphur, and phosphorus, and decomposes the alkaline carbonates, phosphates, fluates, borates, oxalates, tartrates, and citrates.

Medical use.—When applied to the living fibre, lime-water corrugates and shortens it; it therefore possesses astringent powers. It is also a powerful antacid, or at least it combines with, and neutralizes acids when it comes in contact with them. It also dissolves mucus, and kills intestinal worms. From possessing these properties, it is used in medicine, in diseases supposed to arise from laxity and debility of the solids, as diarrhœa, diabetes, leucorrhœa, scrofula, and scurvy; in affections of the stomach accompanied with acidity and flatulence; when the intestines are loaded with mucus; and in worms. Lime-water is scarcely capable of dissolving, even out of the body, any of the substances of which urinary calculi consist; it has therefore no pretensions to the character of a lithontriptic. It has been also recommended in crusta lactea, in cancer, and in chronic cutaneous diseases. Externally, it is applied to ill-conditioned ulcers, gangrenous sores; as a wash in tinea capitis and psora; and as an injection in gonorrhœa, fistulas, and ulcers of the bladder.

When taken internally, its taste is said to be best covered by lukewarm milk. Its dose is commonly from two to four ounces, frequently repeated; but when long continued, it weakens the organs of digestion.

CARBONAS CALCIS PRÆPARATUS; olim, CRETA PRÆPARATA, ET CANCRORUM LAPILLI; vulgo, OCULI CANCRORUM PRÆPARATI. *Edin.*

Prepared Carbonate of Lime; formerly *Prepared Chalk, and Crabs Stones,* commonly called *Crabs Eyes.*

CARBONATE of lime, whether the softer variety commonly called Chalk, or the harder variety called Crabs Eyes and Crabs Stones, after having been triturated to powder in an iron mortar, and levigated on a porphyry stone with a little water, is to be put into a large vessel, and water to be poured upon it, which, after agitating the vessel repeatedly, is to be again poured off, while loaded with minute powder. On allowing the water to settle, a subtile powder will subside, which is to be dried.

The coarse powder which the water could not suspend, may be levigated again, and treated in the same manner.

CRETA PRÆPARATA. *Lond.*

Prepared Chalk.

Take of

Chalk, one pound.

Add a little water to the chalk, and triturate it to fine powder. Throw this into a large vessel filled with water, then agitate them, and, after a short pause, decant off the supernatant liquid, still turbid, into another vessel, and set it aside, that the powder may subside. Lastly, having poured off the water, dry this powder.

TESTÆ PRÆPARATÆ. *Lond.*

Prepared Oyster Shells.

Wash the shells, previously well cleaned, in boiling water, then prepare them in the same manner as chalk is prepared.

CRETA PRÆPARATA. *Dub.*

Prepared Chalk.

Grind it to powder in an earthen-ware mortar, with the addition of a little water; then mix it with a sufficient quantity of water by agitation; and, after allowing it to stand a little, until the coarser particles fall to the bottom, pour off the liquor. This may be frequently repeated, triturating previously each time. Finally, the very fine powder, which, after some time will subside in the decanted liquor, is to be collected and dried upon a bibulous stone or paper.

OTREARUM TESTÆ PRÆPARATÆ.	*Prepared Oystered Shells.*
OVORUM TESTÆ PRÆPARATÆ.	*Prepared Egg Shells.*

Are to be prepared as chalk.

THE preparation of these substances merely consists in reducing them to an impalpable powder.

Medical use.—Carbonate of lime is commonly called an Absorbent Earth. It certainly is an antacid; that is, it combines with and neutralizes most acids, while its carbonic acid is expelled in the form of gas. It is therefore exhibited in affections of the stomach accompanied with acidity, especially when at the same time there is a tendency to diarrhœa. The fear of its forming concretions in the bowels, is probably imaginary; for it is not warranted either by theory or experience.

Applied externally, carbonate of lime may be considered as an absorbent in another point of view; for its beneficial action on burns and ulcers probably arises entirely from its imbibing the moisture or ichorous matter, as a spunge would do, and thus preventing it from acting on the abraded surfaces, and excoriating the neighbouring parts.

CRETA PRÆCIPITATA. *Dub.*

Precipitated Chalk.

Take of

Water of muriate of lime, any quantity.

Add as much carbonate of soda, dissolved in four times its weight of distilled warm water, as is sufficient to precipitate the chalk. Wash the matter which falls to the bottom three times, by pouring on, each time, a sufficient quantity of water. Lastly, having collected it, dry it upon a chalk stone, or paper.

THIS preparation affords carbonate of lime in its purest state, and, although expensive, may be employed when it is intended for internal use.

SOLUTIO MURIATIS CALCIS. *Edin.*
Solution of Muriate of Lime.

Take of
Pure carbonate of lime, that is, white marble, broken into pieces, nine ounces;
Muriatic acid, sixteen ounces;
Water, eight ounces.

Mix the acid with the water, and gradually add the pieces of carbonate of lime. When the effervescence has ceased, digest them for an hour, pour off the liquor, and evaporate it to dryness. Dissolve the residuum in its weight and a half of water, and lastly, filter the solution.

AQUA MURIATIS CALCIS. *Dub.*
Water of Muriate of Lime.

Take of
Chalk, in coarse powder, one ounce;
Diluted muriatic acid, two ounces.

Gradually add the chalk to the acid, and, after the effervescence is finished, filter.

FROM the difficulty of crystallizing this salt, it is directed by the Edinburgh college to be evaporated to the total expulsion of its water of crystallization, as being the surest way of obtaining a solution of uniform strength. With the same view, the Dublin college saturate muriatic acid of a given strength; and Dr. Wood directs, that the solution should always have a determinate specific gravity.

The crystals of this salt are prisms of six smooth and equal sides, but they are often so aggregated, that they can only be termed acicular. Its taste is pungent, bitter, and disagreeable. When heated, it melts, swells, and loses its water of crystallization, and, at a very high temperature, a small part of its acid. It is one of the most deliquescent salts known, and is so soluble, that water seems capable of dissolving twice its weight, or, at least, forms with it a viscid liquor; but as it is still capable of attracting moisture from the air, and of emitting caloric, when farther diluted, it can scarcely be considered as a true solution. It is soluble in alcohol, and its solution burns with a crimson flame. It is decomposed by the sulphuric, nitric, phosphoric, fluoric, and boracic acids; by baryta, potass, soda, and strontia; by most of the sulphates, sulphites, nitrates, phosphates, fluates, borates, and the alkaline carbonates. Crystallized, it contains

31 acid, 44 lime, and 25 water; dried at a red heat, 42 acid, 50 lime, and 8 water.

Medical use.—It was first proposed as a medicine by Fourcroy, and has been lately extolled in scrofulous and glandular diseases, and cases of debility in general, by several eminent practitioners of our own country, Dr. Beddoes, Dr. R. Pearson, and Dr. Wood. Thirty drops of the solution are a sufficient dose for children, and a drachm for adults, repeated twice or thrice a-day. In an over-dose, it has produced qualms and sickness; and three drachms and a half killed a dog, the stomach of which, upon dissection, had its villous coat bloodshot, and in many parts almost black, and converted into a gelatinous slime. The property of this salt, of producing intense cold during its solution, might also be applied to medical use For this purpose it might be economically prepared, by saturating with muriatic acid the residuum of the distillation of ammonia, or of carbonate of ammonia.

PHOSPHAS CALCIS.
CORNU USTUM. *Lond.*
Phosphate of Lime. Burnt Horn.

Burn pieces of horn in the open fire, until they become perfectly white; then reduce them to powder, and prepare in the same manner as is directed for chalk.

PULVIS CORNU CERVINI USTI. *Dub.*
Powder of Burnt Harts-horn.

Burn pieces of harts-horn till they become perfectly white; then reduce them to a very fine powder.

THE pieces of horn generally employed in this operation, are those left after distillation.

In the burning of harts-horn, a sufficient fire, and the free admission of air, are necessary. The potter's furnace was formerly directed, for the sake of convenience; but any common furnace or stove will do. Indeed, too violent a heat makes their surface undergo a kind of fusion and vitrification, which both prevents the internal parts from being completely burnt, and renders the whole less soluble. If the pieces of horn be laid on some lighted charcoal, spread on the bottom of the grate, they will be burnt to whiteness, still retaining their original form.

According to the analysis of Merat Guillot, harts-horn consists of 27. gelatine, 57.5 phospate of lime, 1. carbonate of lime, and there was a loss of 14.5, probably water. Now, as the gelatine is destroyed by burning, and the water expelled, the substance which remains is phosphate of lime, mixed with less than two *per cent.* of carbonate of lime. The bones of animals have lately been discovered to contain phosphate of magnesia.

Medical use.—From its white earthy appearance, it was formerly considered as an absorbent earth. But since it has been accurately analysed, that idea has been laid aside, and its use has been suggested as a remedy in rickets, a disease in which the deficiency of the natural deposition of phosphate of lime in the bones seems to be the essential, or, at least, the most striking symptom. M. Bonhomme, however, gave it to the extent of half a scruple, mixed with phosphate of soda, in several cases, with apparent success. Whatever objections may be made to his theory, the practice certainly deserves a trial.

MAGNESIA. *Ed.*

Magnesia.

Let carbonate of magnesia, put into a crucible, be kept in a red heat for two hours; then put it up in close-stopt glass vessels.

Lond.

Take of
Carbonate of magnesia, four ounces.
Burn it with a very fierce fire for two hours, or until acetic acid dropt into it cause no effervesence.

MAGNESIA USTA. *Dub.*

Calcined Magnesia.

Take of
Magnesia, any quantity;
Expose it to a strong heat, in a crucible, for two hours; and, when cold, put it into a glass vessel closely stopt.

By this process the carbonate of magnesia is freed of its acid and water; and, according to the late Dr. Black's experiments, loses about $\frac{7}{12}$ of its weight. A kind of opaque foggy vapour is observed to escape during the calcination, which is nothing else than a quantity of fine particles of magnesia, buoyed off along with a stream of the disengaged gas. About the end of the operation, the magnesia exhibits a kind of luminous or phosphorescent property, which may be considered as a pretty exact criterion of its being deprived of its acid.

It is to be kept in close vessels, because it attracts, though slowly, the carbonic acid of the atmosphere.

We have already noticed its general chemical properties.

Medical use.—It is used for the same general purposes as the carbonate. In certain affections of the stomach, accompanied with much flatulence, magnesia is preferable, both because it contains more magnesia in a given bulk, and, being deprived of its acid, it neutralizes the acid of the stomach, without any extrication of gas, which is often a troublesome consequence when carbonate of magnesia is employed in these complaints.

CARBONAS MAGNESIÆ. *Ed.*

Carbonate of Magnesia.

Take of
Sulphate of magnesia;
Carbonate of potass, equal weights.

Dissolve them separately in double their quantity of warm water, and let the liquors be strained, or otherwise freed, from their fæces; then mix them, and instantly add eight times their quantity of warm water. Let the liquor boil for a little on the fire, stirring it at the same time; then let it rest till the heat be somewhat diminished; after which strain it through linen: the carbonate of magnesia will remain upon the cloth; and is to be washed with pure water till it become altogether void of saline taste.

Lond.

Take of
Sulphate of magnesia;
Subcarbonate of potass, of each one pound;
Water, three gallons.

Dissolve separately the subcarbonate in three pints of the water, and the sulphate in five, and filter. Then add the rest of the water to the solution of the sulphate; and, while it is boiling, mix with it, under constant stirring, the solution of the subcarbonate, and filter through linen. Lastly, wash the powder with repeated affusions of boiling water, and dry upon blotting paper, with a heat of 200°.

MAGNESIA. *Dub.*

Magnesia.

Take of
Sulphate of magnesia,
Subcarbonate of kali, of each two pounds;
Boiling water, twenty pints.

Dissolve the sulphate of magnesia and the kali, each in ten pounds of water. Mix the defæcated liquors. Boil the mixture a little, and, while still warm, filter it through linen, stretched, so as to fit it for collecting the magnesia. Wash off the sulphate of kali, by repeated affusions of boiling water; and, lastly, dry the magnesia.

In this process, there is a mutual decomposition of the two salts employed. The potass unites itself to the sulphuric acid, while the carbonic acid combines with the magnesia. The large quantity of water used is necessary for the solution of the sulphate of potass formed; and the boiling is indispensably requisite for the expulsion of a portion of carbonic acid, which retains a part of the magnesia in solution: 100 parts of crystallized carbonate of potass are sufficient for the decomposition of 125 parts of sulphate of magnesia; and, from these quantities, about 45 parts of carbonate of magnesia are obtained.

The ablutions should be made with very pure water; for nicer purposes distilled water may be used; and soft water is, in every case, necessary. Hard water, for this process, is peculiarly inadmissible, as the principle in waters, giving the property called *hardness*, is generally a salt of lime, which decomposes the carbonate of magnesia, by compound affinity, giving rise to carbonate of lime, while the magnesia unites itself to the acid of the calcareous salt, by which the quantity of the carbonate is not only lessened, but is rendered impure by the admixture of carbonate of lime. Another source of impurity is the silica, which the sub-carbonate of potass generally contains. It is most easily got rid of by exposing the alkaline solution to the air for several days before it is used. In proportion as it becomes saturated with carbonic acid, the silica is precipitated, and may be separated by filtration.

In the preparation of the carbonate of magnesia, the Berlin college order carbonate of soda to be used, which has the advantage of forming with the sulphuric acid of the sulphate of magnesia a much more soluble salt than the sulphate of potass. The carbonate of magnesia of commerce is prepared from the muriate of magnesia, which remains in solution after the crystallization of muriate of soda from sea-water.

The carbonate of magnesia, thus prepared, is a very light, white, opaque substance, without smell or taste, effervescing with acids. It is not, however, saturated with carbonic acid. By decomposing sulphate of magnesia by an alkaline carbonate, without the application of heat, carbonate of magnesia is gradually deposited in transparent, brilliant, hexagonal crystals, terminated by an oblique hexagonal plane, and soluble in about 480 times their weight of water. The crystallized carbonate of magnesia consists of 50 acid, 25 magnesia, and 25 water; the subcarbonate consists of 48 acid, 40 magnesia, and 12 water; and the carbonate of commerce, of 34 acid, 45 magnesia, and 21 water. It is decomposed by all the acids, potass, soda, baryta, lime, and strontia, the sulphate, phosphate, nitrate, and muriate of alumina, and the super-phosphate of lime.

Medical use.—Carbonate of magnesia is principally given to correct acidity of the stomach, and, in these cases, to act as a purgative; for solutions of magnesia in all acids are bitter and purgative, while those of the other earths are more or less austere and astringent. A large dose of magnesia, if the stomach contain no acid to dissolve it, neither purges nor produces any sensible effect: a moderate one, if an acid be lodged there, or if acid liquors be taken after it, procures several stools; whereas the common absorbents, in the same circumstances, instead of loosening, bind the belly. When the carbonate of magnesia meets with an acid in the stomach, there is extricated a considerable quantity of carbonic acid gas, which sometimes causes uneasy distension of the stomach, and the symptoms of flatulence. In such cases, therefore, magnesia is preferable to its carbonate; but, on other occasions, as in nausea and vomiting, good effects arise from the action of the gas evolved.

SULPHAS ALUMINÆ EXSICCATUS, olim ALUMEN USTUM. *Ed.*

Dried Sulphate of Alumina, formerly *Burnt Alum.*

Melt alum in an earthen or iron vessel, and keep it over the fire until it cease to boil.

ALUMEN EXSICCATUM. *Lond.*

Dried Alum.

Melt alum in an earthen pot over the fire, which is to be increased until the ebullition cease.

ALUMEN USTUM. *Dub.*

Burnt Alum.

Take of

Alum, any quantity.

Burn it in an earthen vessel, with a strong fire, until it cease to boil.

MR. CHAPTAL found, that by exsiccation in a red heat, alum of his own manufacture lost 0.67, Roman alum 0.50, English alum 0.47, and Levant alum only 0.40. These differences arise principally from different proportions of water of crystallization, but also from an excess of alumina, which the last contains.

According to Kirwan, crystallized alum consists of 17.66 acid, 12. alumina, and 70.24 water, and alum desiccated at 700°, of 36.25 acid, and 63.75 basis, by which it would appear, that at that heat, it loses not only all its water, but also more than half its acid.

Dried alum is only applied externally, as a gentle escharotic, o fungous ulcers.

CHAP. V.—METALLINE PREPARATIONS.

ANTIMONY.

SULPHURETUM ANTIMONII PRÆPARATUM. *Ed.*

Prepared Sulphuret of Antimony.

Sulphuret of antimony is prepared in the same way as carbonate of lime.

Dub.

Reduce it to powder, and separate the impalpable particles, in the manner directed for the preparation of chalk, for use.

By reducing the sulphuret of antimony to the state of an impalpable powder, it is both rendered much more active, and is prevented from irritating the stomach mechanically, of which there would be some danger, from the sharpness of its spiculæ. Even in this state, however, it is not a very certain remedy. In general, it operates as a mild sudorific or cathartic; but sometimes, if it meet with much acid in the stomach, it becomes more active, producing vomiting and hypercatharsis. Therefore, it seems prudent to evacuate the primæ viæ before it be exhibited, and to combine it with an absorbent earth.

It is principally given in scrofula, glandular obstructions, cutaneous diseases, and rheumatism. Its dose is from 10 to 30 grains, and upwards; and it is best exhibited in the form of a powder or bolus.

OXIDUM ANTIMONII CUM SULPHURE, PER NITRATEM POTASSÆ; olim CROCUS ANTIMONII. *Ed.*

Oxide of Antimony, with Sulphur, by Nitrate of Potass; formerly *Crocus of Antimony.*

Take of
Sulphuret of antimony,
Nitrate of potass, equal weights.

After they are separately powdered, and well mixed, let them be injected into a red hot crucible; when the deflagration is over, the reddish matter is to be separated from the whitish crust, and reduced to powder, which is to be edulcorated by repeated washings with hot water, till the water come off insipid.

In this process, the nitric acid of the nitre, and part of the sulphuret, are mutually decomposed: the sulphur is acidified, and combines with the potass of the nitre, while the antimony is converted into protoxide, which combines with the undecomposed portion of the sulphuret, and forms a dark brown, opaque, vitrified mass; so that, after the scoriæ, and other saline matters, have been removed by washing, the substance which remains, according to Proust, consists of three parts of oxide of antimony, and one of sulphuret of antimony.

With regard to the mode of preparation, Bergmann observes, that, by the common process of throwing the mixture into an ignited uncovered crucible, there is sometimes a loss of nearly one half; and, therefore, advises the mixture to be put into a cold crucible, which is to be covered, and heated till the matter melts, by which means there is very little loss.

What is kept in the shops, is almost universally prepared with less nitre than is here ordered. The consequence is, that too much sulphur remains not acidified, the antimony is scarcely oxidized, and the preparation is unfit for the uses to which it ought to be applied. When nitre has been thus culpably economized, the crocus has a steel grey, instead of a liver brown colour.

The sulphuretted oxide of antimony is a very uncertain preparation, often operating with very great violence. Its internal use is, therefore, almost proscribed, or at least confined to maniacal cases, and veterinary practice. It is used in pharmacy, as the basis of other preparations in some Pharmacopœias; but the London college have rejected it altogether, and have substituted the purer oxides of antimony prepared from the muriate.

OXIDUM ANTIMONII, CUM SULPHURE, VITRIFICATUM; olim VITRUM ANTIMONII. *Ed.*

Vitrified Oxide of Antimony with Sulphur, formerly *Glass of Antimony.*

Strew sulphuret of antimony, beat into a coarse powder, like sand, upon a shallow, unglazed, earthen vessel, and apply a gentle heat underneath, that the antimony may be heated slowly: stirring it, at the same time, continually, to prevent it from running into lumps. White vapours, of a sulphureous smell, will arise from it. When they cease with the degree of heat first applied, increase the fire a little, so that vapours may again arise; go on in this manner, till the powder, when brought to a red heat, exhales no more vapours. Melt this powder in a crucible, with an intense heat, till it assumes the appearance of melted glass; then pour it out on a heated brass plate.

Glass of antimony, according to Proust, consists of one part of sulphuret of antimony, combined with eight of oxide of antimony: now, by this process, the greatest part of the antimony is deprived of its sulphur, and is, at the same time, converted into the protoxide, which combines with the small portion of sulphuret which remains undecomposed. But, as this preparation is not easily made in the manner here directed, unless in a furnace constructed on purpose, apothecaries may advantageously adopt the synthetical method of Bergmann, which consists in melting in a crucible, with one twelfth or eighth of its weight of sulphur, protoxide of antimony, prepared by deflagrating it with more than twice its weight of nitre. At the temperature necessary for melting it, the protoxide of antimony loses great part of its oxygen, and is converted into sulphuret and protoxide, in the proportions which form the glass of antimony.

The glass of antimony is transparent, and has a fine hyacinthine colour. On dissolving it in muriatic acid, it gives out sulphuretted hydrogen gas. Its medical operation is so uncertain, that is only used in making other preparations.

OXIDUM ANTIMONII VITRIFICATUM, CUM CERA; olim Vitrum Antimonii Ceratum. *Ed.*

Vitrified Oxide of Antimony with Wax, formerly *Cerated Glass of Antimony*.

Take of
Yellow wax, one part;
Vitrified oxide of antimony, with sulphur, eight parts.

Melt the wax in an iron vessel, and throw into it the powdered oxide: roast the mixture over a gentle fire, for a quarter of an hour, continually stirring it; then pour it out, and, when cold, grind it into powder.

The glass melts in the wax, with a very gentle heat: after it has been about twenty minutes on the fire, it begins to change its colour, and in ten more, comes near to that of Scottish snuff, which is a mark of its being sufficiently prepared; the mixture loses about one ninth of its weight in the process.

This medicine was for some time much esteemed in dysenteries. The dose is from two or three grains to twenty, according to the age and strength of the patient. In its operation, it makes some persons sick, and vomit; it purges almost every one; though it has sometimes effected a cure without occasioning any evacuation or sickness. It is now, however, much less used than formerly.

SULPHURETUM ANTIMONII PRÆCIPITATUM. *Ed.*

Precipitated Sulphuret of Antimony.

Take of
Water of potass, four pounds;
Water, three pounds;
Prepared sulphuret of antimony, two pounds.

Boil them, in a covered iron pot, over a slow fire, for three hours, adding more water, if necessary, and frequently stirring the mixture with an iron spatula: strain the liquor, while warm, through a double cloth, and add to it, when filtered,
Diluted sulphuric acid,
as much as is necessary to precipitate the sulphuret, which must be well washed with water.

Lond.

Take of
Sulphuret of antimony, in powder, two pounds;
Solution of potass, four pints;
Distilled water, three pints.

Mix and boil, with a gentle fire, for three hours, constantly stirring, and adding, from time to time, as much distilled water as to keep up the original quantity. Quickly filter the solution through double linen, and gradually drop into it, when still hot, as much diluted sulphuric acid as may precipitate it; then wash away the sulphate of potass with warm water; dry the precipitated sulphuret of antimony, and triturate it to powder.

SULPHUR ANTIMONIATUM FUSCUM. *Dub.*

Brown Antimoniated Sulphur.

Take of
Prepared sulphuret of antimony,
Sub-carbonate of kali, each one ounce.

Melt them, previously mixed, in a crucible. Powder the mass, when cold. Put it into a matrass, with four pints of water, and boil for a quarter of an hour. Remove the vessel from the fire, and cover it: let it rest a little, and, as soon as the liquor has become limpid, decant it cautiously from the sediment. The antimoniated sulphur will, in part, be separated by the cooling of the liquor: add a sufficient quantity of diluted sulphuric acid to precipitate the whole of it, which happens with excess of acid; agitate the mixture, that what is last thrown down (which is of an orange colour) may be mixed with the rest. After allowing it to stand a sufficient time, pour the liquor from the sediment, which is to be washed with cold water, as long as it affects lithmus paper. Lastly, dry it upon blotting paper.

In both of these preparations, the result is a hydro-sulphuret of antimony with excess of sulphur. Formerly there were two officinal antimonials of this nature, one of which (kermes mineral), contained no excess of sulphur, and the other (sulphur auratum antimonii) contained a much larger proportion of sulphur than those now officinal, which, therefore, hold a middle place between them. According to Thenard, they consist of

	Sulph. aur.	Kermes min.
Brown oxide of antimony	68.3	72.760
Sulphuretted hydrogen	17.877	20.298
Sulphur - -	12.	4.156
Water and loss -	1.823	2.786
	100.	100.

Thenard considers the sulphur as only mechanically and accidentally mixed; and that the essential difference between these preparations consists in the degree of oxidizement of the antimony.

But, notwithstanding the great celebrity of Thenard as a chemist, and his having paid particular attention to the combinations of antimony, we may be allowed to doubt the accuracy of his opinion; for it must appear to every one, an affected refinement of analysis, to discover in such substances a difference of only 2 *per cent.* of oxidizement, more especially as he admits an inaccuracy in his analysis of at least as much; and as Proust has since shewn that both preparations contain the protoxide, the only difference between these bodies appears to be the proportion of sulphur they contain.

Hydro-sulphuret of antimony is prepared either in the dry way, as directed by the Dublin, or in the humid way, as in the receipt of the Edinburgh and London colleges. When sulphuret of antimony is boiled in a solution of potass, water is decomposed, the hydrogen combines with the sulphur, and the antimony is oxidized; and, as long as the solution boils, it contains a mixture of hydro-sulphuret of potass and hydro-sulphuret of antimony. But, on cooling, a great part of the latter precipitates in the form of a red powder (Kermes mineral).

In the dry way, when sulphuret of antimony and carbonate of potass are melted together, the carbonic acid is expelled with effervescence, and a sulphuret of potass and antimony is formed. On boiling this in water, water is decomposed, the antimony is oxidized, and the hydrogen combines with the sulphur.

The sulphuretted hydrogen, thus formed, combines partly with the potass, and partly with the oxide of antimony.

Such is the present theory. With regard to the practice for the preparation of Kermes mineral, Lemery melted sixteen parts of sulphuret of antimony, and one of sulphur, with eight parts of carbonate of potass. The last edition of the Prussian Pharmacopœia directs two parts of sulphuret of antimony, and one of exsiccated carbonate of soda, to be melted, and afterwards boiled fifteen minutes in six or eight parts of water, which, on cooling, deposits a considerable quantity of kermes. The fluid from which the kermes has been deposited, may be again boiled in the residuum of the first decoction, and it will dissolve a fresh proportion of kermes; and this process may be repeated as long as there remains any to dissolve. After this, the residuum, when melted, consists almost solely of antimony. It therefore seems, that the alkali renders almost all the sulphur soluble, and only disposes the oxidizement of as much antimony as is capable of combining with the sulphuretted hydrogen. There appears to be no reason why the whole of the antimony should not be converted into kermes, by employing a proper addition of sulphur and alkali.

Kermes is also made in the humid way. Fourcroy boils, in twenty parts of water, six parts of pure potass of commerce, and into the boiling solution throws about the twentieth part of the weight of the alkali, or 0.3 of a part, of powdered sulphuret of antimony, and continues the boiling for seven or eight minutes, then filters, and allows the kermes to precipitate by cooling. Hermbstadt uses very different proportions; for he boils twelve parts of sulphuret of antimony, and three of salt of tartar, in ninety-six parts of water, down to sixty-four, and then filters, &c. Gren employs four parts of sulphuret of antimony, sixteen of carbonate of potass, and sixty-four of water, and boils for several hours. Göttling boils eight parts of sulphuret of antimony, and two of sulphur, in a sufficient quantity of solution of potass, down to one half.

The precipitated sulphuret of antimony, like the kermes, may be prepared either in the dry or in the moist way. The latter mode seems to be the most universally employed on the continent. Göttling boils two parts of sulphuret of antimony, and three of sulphur, in a sufficient quantity of a recent solution of potass, filters the solution, and precipitates with sulphuric acid, diluted with twelve times its weight of water. The Prussian college use equal parts of sulphuret of antimony and of sulphur. Wiegleb treats in the same manner two parts of sulphuret of antimony with one of sulphur. But to his proportions it has been objected, that the product resembles kermes more than sulphur auratum. If this objection be just, it must apply, in a still stronger degree, to the formula of the British colleges, in which no sulphur is added.

In the dry way, two parts of sulphuret of antimony and three of sulphur, may be melted with five or six pure carbonate of potass in a covered crucible, as quickly as possible, poured into an iron mortar, reduced to powder, and dissolved by boiling the powder in water. The solution is to be filtered warm, diluted with a sufficient quantity of water, and precipitated by dilute sulphuric acid. By some, the solution is allowed to remain at rest for twenty-four hours before it be filtered, and some precipitate by nitrous acid.

The processes for making the golden sulphuret of antimony depend on the property which the hydroguretted sulphuret of potass possesses, of dissolving, and retaining dissolved, even at ordinary temperatures, a portion of orange oxide of antimony; and as the attraction by which potass exists in this compound is weaker than its affinity for acids, on the addition of any acid, the potass unites with the acid, a portion of sulphuretted hydrogen gas escapes, and the oxide of antimony, combined with the rest of the sulphur and hydrogen, are precipitated in the form of a light orange powder. When the acid is added gradually, the proportion of oxide of antimony decreases, while that of the sulphur increases in each successive portion of precipitate. Hence, in the old manner of preparing this substance, from the scoriæ formed in reducing antimony from its sulphuret, and which contained but little sulphur, the two first portions of precipitate, being dark coloured, were rejected, and only the produce of the third precipitation retained for use. The want of economy in this process is sufficiently obvious, as well as the very great improvement in modern times, of adding a sufficient quantity of sulphur, and precipitating the whole at once.

Medical use.—In its action on the body, the hydro-sulphuret of antimony is an active substance, and, according to the dose, acts as a diaphoretic, cathartic, or emetic. Its use is, in this country, in a great degree superseded by more certain preparations.

MURIAS ANTIMONII. *Ed.*

Muriate of Antimony.

Take of
- Oxide of antimony, with sulphur, by nitrate of potass,
- Sulphuric acid, each one pound;
- Dried muriate of soda, two pounds.

Pour the sulphuric acid into a retort, gradually adding the muriate of soda and oxide of antimony, previously mixed. Then perform the distillation in a sand-bath. Expose the distilled matter for several days to the air, that it may deliquesce, and then pour the liquid from the fæces.

OXYDUM ANTIMONII NITRO-MURIATICUM. *Dub.*

Nitro-Muriatic Oxyde of Antimony.

Take of

Prepared sulphuret of antimony, two ounces;
Muriatic acid, eleven ounces by measure;
Nitrous acid, one drachm by measure.

Add the sulphuret gradually to the acids, previously mixed in a glass vessel, avoiding the vapours. Digest with a heat gradually increased, until the effervescence cease, and then boil for one hour. Filter the liquor when cold, and receive it when filtered in a gallon of water. The oxide of antimony will fall to the bottom. Wash this repeatedly in a sufficiently large quantity of water, until the liquor poured off be perfectly free from acid, as known by the test of lithmus; and, lastly, dry the oxide upon bibulous paper.

ANTIMONII OXYDUM. *Lond.*

Oxyde of Antimony.

Take of

Sulphuret of antimony, in powder, two ounces;
Muriatic acid, eleven fluidounces;
Nitric acid, one fluidounce.

Gradually add the antimony to the acids previously mixed in a glass vessel, and boil with a boiling heat for an hour; then filter, and pour the filtered solution into a gallon of water, in which two ounces of

Sub-carbonate of potass

have been previously dissolved. Wash the precipitated powder with repeated affusions of water, until no acid remain; then dry upon blotting paper.

Muriate of antimony was originally prepared by distilling sulphuret of antimony with muriate of quicksilver. Muriate of antimony, or butter of antimony, as it was called from its appearance, when recently prepared, passes over into the receiver, and black sulphuret of quicksilver remains in the retort; or, by increasing the heat, red sulphuret of mercury, which, when obtained by this process, was formerly termed Cinnabar of antimony, is sublimed. But this mode of preparation is both expensive and dangerous to the health of the operator.

Scheele invented a method of avoiding these inconveniences. A sulphuretted oxide of antimony is prepared by deflagrating two parts of sulphuret of antimony with three of nitrate o potass in an iron mortar. The mass thus obtained is powdered, and one pound of it put into a glass vessel, on which is poured first a mixture of three pounds of water and fifteen ounces of sulphuric acid, and afterwards fifteen ounces of powdered common salt. The whole is digested for twelve hours, and stirred all the while, and the solution, when cool, strained through linen. On the residuum one third of the above menstruum is poured, and the mixture digested and strained. When diluted with boiling water, a copious precipitate of sub-muriate of antimony takes place from the decomposition of the muriate, while the other salts contained in the solution are not affected by it. Mr. Stott says, that the digestion need not be continued longer than two or three hours, and that the heat must be kept moderate, as the muriate of antimony begins to evaporate before it boils. This process furnishes an easy, if not the best, mode of preparing the sub-muriate of antimony.

To obtain the muriate, we may separate it from the other salts by distillation. This was proposed by Gmelin, and improved by Wiegleb, who distilled a mixture of one part of sulphuret of antimony, four of muriate of soda, and three of sulphuric acid diluted with two of water; but the product is rendered impure by the admixture of sulphur, and there is great danger of the vessels bursting, from the immense quantity of sulphuretted hydrogen gas disengaged.

In 1781, the process of the Edinburgh college was first introduced into the London Pharmacopœia. The Prussian Dispensatory pours upon two ounces of crocus of antimony, and six of dried muriate of soda, introduced into a retort, four ounces of sulphuric acid previously diluted with two ounces of distilled water, and distil. But we have already observed, that the antimony in the crocus is seldom sufficiently oxidized or deprived of its sulphur, which occasions the production of much sulphuretted hydrogen gas; and from the concentrated state in which the materials are employed, the muriatic acid gas is sometimes disengaged, especially if the heat be improperly applied, so rapidly, that it has not time to act upon the oxide of antimony.

At last, in 1797, Göttling, by substituting the glass of antimony for the crocus, diluting further the sulphuric acid, and using the muriate of soda crystallized, removed these inconveniencies. He introduces into a retort a mixture of four ounces of glass of antimony in powder, with sixteen of murate of soda, and then pours into it twelve ounces of sulphuric acid, diluted with eight of water. He lutes on a tubulated receiver with gypsum, and distils to dryness in a sand-bath, with a heat gradually increased. By this process, he says, about twenty ounces of very strong fuming solution of muriate of antimony are obtained. The residuum in the retort is sulphate of soda, but unfit for internal use, on account of its being mixed with some antimony.

Muriate of antimony is crystallizable. It is remarkably deliquescent, and forms a permanent solution; but if more than a certain proportion of water be added, it is decomposed; a large quantity of sub-muriate of antimony being precipitated, in the form of white silky crystals, while a super-muriate remains in solution.

Muriate of antimony has been used as a caustic, but not for a long time; it is so extremely unmanageable. It is now only prepared as preliminary to the precipitation of the sub-muriate or oxide of antimony from it. Muriate of antimony, when diluted with water, is decomposed, a super-muriate remains in solution, and an insoluble sub-muriate is precipitated in the form of white acicular or silky crystals, formerly known under the title of *Pulvis Algaroti*, and is the *oxydum antimonii nitro-muriaticum* of the Dublin college. That this is a sub-muriate, is proved by its yielding a small proportion of muriate on distillation, as pointed out by Bergmann. In the process of the London college, the decomposition is more complete, as it is assisted by the attraction of the alkali for the muriatic acid. It also gives a larger produce, as the whole oxide is precipitated, and it is of a duller white than the sub-muriate. It is of importance, for the success of this operation, that the muriate of antimony be poured into the alkaline solution, as by a contrary procedure we should get a mixed precipitate of sub-muriate and oxide.

OXIDUM ANTIMONII CUM PHOSPHATE CALCIS. *Ed.*

Oxide of Antimony, with Phosphate of Lime.

Take of
 Sulphuret of antimony, in coarse powder;
 Shavings of harts-horn, equal weights.

Mix, and put them in a wide red-hot iron pot, and stir the mixture constantly, until it be burnt into a matter of a grey colour, which is then to be removed from the fire, ground into powder, and put into a coated crucible. Lute to this crucible another inverted over it, and perforated in the bottom with a small hole, and apply the fire, which is to be raised gradually to a white heat, and kept in that increased state for two hours. Lastly, grind the matter, when cold, into a very fine powder.

PULVIS ANTIMONIALIS. *Dub.*

Antimonial Powder.

Take of
 Sulphuret of antimony, in coarse powder;

Shavings of harts-horn, of each two pounds.

Boil the harts-horn in a sufficient quantity of water, to separate the animal jelly. Then dry it, and mix it with the antimony. Throw the mixture into a wide iron pot, heated to redness, stirring continually until the sulphureous vapours cease, and the mass acquire a grey colour. When cold, reduce it to powder, and put it into a luted crucible. Invert another crucible, having a small hole in its bottom, over this, and lute them accurately together. Roast the powder for two hours, with a heat gradually increased to whiteness, and when cold, grind it to a very fine powder.

Lond.

Take of

Sulphuret of antimony in powder, one pound;

Horn shavings, two pounds.

Mix, and throw them into a wide iron pot, heated to whiteness, stirring them assiduously until they become of a grey colour. Take them out and powder them. Put the powder into a coated crucible, to which another crucible, having a hole in its bottom, and inverted over it, is luted. Then apply heat, and gradually increase it, until it be kept white for two hours. Triturate the residuum into very fine powder.

THIS is supposed to be nearly the same with the celebrated nostrum of Dr. James, the composition of which was ascertained by Dr. George Pearson, to whom we are also indebted for the above formula.

By burning sulphuret of antimony and shavings of harts-horn in a white heat, the sulphur is entirely expelled, and the antimony is oxidized, while the gelatine of the harts-horn is destroyed, and nothing is left but phosphate of lime, combined with a little lime. Therefore, the mass which results is a mixture of oxide of antimony and phosphate of lime, which corresponds, at least as to the nature of the ingredients, with James's powder, which, by Dr. Pearson's analysis, was found to consist of 43 phosphate of lime, and 57 oxide of antimony. M. Pulley also analysed some James's Powder, and found it composed of protoxide of antimony 37, phosphate of lime 21, sulphate of potass 24, and potass combined with protoxide of antimony 18. On which occasion, M. Cadet, ignorant that even quack-medicines were often imitated and adulterated, accuses Dr. Pearson of having sanctioned with his name a false analysis, in order to conceal a secret so profitable to his country! Mr. Chenevix, by considering the uncertainty of the application, and the precarious nature of the agency, of fire, by which means a variable portion of the oxide of antimony may be volatilized, and that which remains may be oxidized in various degrees, proposes to prepare a substitute for James's powder, by dissolving together equal weights of sub-muriate of antimony, and of phosphate of lime, in the smallest possible quantity of muriatic acid, and then pouring this solution gradually into water sufficiently alkalized with ammonia. As muriate of antimony is partially decomposed by water, it is absolutely necessary that the muriatic solution be poured into the alkaline liquor, as, by an opposite mode of procedure, a great part of the antimony would be precipitated in the state of sub-muriate, and the first portion of the precipitate would consist chiefly of antimony, and the last of phosphate of lime.

Phosphate of lime is most conveniently obtained pure by dissolving calcined bone in muriatic acid, and by precipitating it by ammonia. If the ammonia be quite free from carbonic acid, no muriate of lime is decomposed. Mr. Chenevix also found, that his precipitate is entirely soluble in every acid which can dissolve either phosphate of lime or oxide of antimony separately, and that about 0.28 of James's powder, and, at an average, 0.44 of the pulvis antimonialis of the late London Pharmacopœia, resist the action of every acid.

In the new edition, twice the proportion of harts-horn shavings are used, which is said to obviate the inconvenience of the vitrification of part of the antimony when too high a temperature was applied, and to render it more manageable.

Medical use.—The oxide of antimony with phosphate of lime, howsoever prepared, is one of the best antimonials we possess. It is given as a diaphoretic in febrile diseases, in doses of from three to eight grains, repeated every third or fourth hour. In larger quantities, it operates as a purgative or emetic. From its being insoluble in water, it must be given either in the form of a powder, or made into a pill or bolus.

TARTRIS ANTIMONII, olim TARTARUS EMETICUS. *Ed.*
Tartrite of Antimony, formerly *Tartar Emetic.*

Take of
Oxide of antimony with sulphur, by nitrate of potass, three parts;
Super-tartrite of potass, four parts;
Distilled water, thirty-two parts;
Boil in a glass vessel for a quarter of an hour, strain through paper, and set aside the filtered liquor to crystallize.

ANTIMONIUM TARTARIZATUM. *Lond.*
Tartarized Antimony.

Take of
Oxide of antimony, two ounces;

Super-tartrate of potass, in powder, three ounces;
Distilled water, eighteen fluidounces.

Gradually throw the antimony and super-tartrate of potass, mixed together, into the water, heated to boiling in a glass vessel, and boil for half an hour; filter the solution through paper, and evaporate with a gentle fire, so as to crystallize by slow cooling.

TARTARUM ANTIMONIATUM SIVE EMETICUM. *Dub.*
Antimoniated or Emetic Tartar.

Take of
Nitro-muriatic oxide of antimony, two ounces;
Crystals of tartar, in very fine powder, two ounces and a half;
Distilled water, eighteen ounces by measure.

Boil the water in a glass vessel, then gradually throw into it the oxide and tartar, previously mixed, and boil for half an hour; then filter the liquor through paper, and crystallize by slow cooling.

THE tartaric acid is capable of combining, in many examples, with two bases at the same time, forming with them triple crystallizable salts. In the present instance, it is combined with oxide of antimony and potass; and as the potass is essential to its constitution, and the real tartrate of antimony is a different salt, its name, on chemical principles, should certainly have been Tartrate of Antimony and Potass.

In the preparation of this salt, the different combinations of protoxide of antimony have been employed. Any of them will afford a very pure salt. The crocus, precipitated oxide, submuriate, and glass, are all occasionally employed. The Edinburgh college uses the crocus. To this the principal objection is, that it is never found in the shops in a state fit for this purpose. The London college use the precipitated oxide, and the Dublin the sub-muriate, which is just as good; for the muriatic acid is completely separated by part of the potass, and remains in the mother water. Mr. Stott, however, thinks muriatic acid essential to the constitution of good tartar emetic, and says, that he could never obtain it in transparent crystals, when he employed the glass or crocus, or any other oxide of antimony than the pulvis algarothi. He therefore concludes, that tartar emetic is a quadruple salt, consisting of oxide of antimony with muriatic acid, rendered soluble by acid of tartar, combined with an under proportion of potass; but I have repeatedly prepared tartar-emetic perfectly colourless, and in very large and beautiful crystals, both with the crocus and glass; and therefore muriatic acid, if ever present, must always be considered as an impurity. The glass is perhaps the least objectionable of any of the oxides used, and is recommended by Göttling. It always, however, contains about 0.1 of silica. The quantity of water employed must be sufficient to dissolve the tartar-emetic formed. The time during which the ebullition is to be continued, is stated differently by different pharmaceutists. No harm can arise from continuing it longer than is absolutely necessary; but it is certainly a waste of time and fuel to protract it for hours. But the circumstance which renders the tartar-emetic most variable in its effects, is the mode of crystallization. Some evaporate it to dryness; others to a pellicle, and set it aside to crystallize; and others again crystallize by slow evaporation. On account of the silica which is combined with the oxide of antimony, and which, being held in solution by the potass, impedes the crystallization, and varies the nature of the product, Vauquelin recommends that the solution be first evaporated to dryness, and that the saline mass obtained should be redissolved in boiling water, and then crystallized; for, towards the end of the first evaporation, the silica separates, and becomes totally insoluble. In this way, he says, that we obtain both a purer salt, and in larger quantity. If we employ an excess of super-tartrate of potass, part of it will remain undecomposed, and will crystallize before, or along with the tartar-emetic. This source of impurity is easily avoided, by using an excess of the antimonial oxide, which remaining undissolved, occasions no error, and prevents the necessity of throwing away the crystals which form on the filtering paper, if the solution be saturated.

The primitive form of the crystals of tartrate of antimony and potass seems to be the regular tetrahedron, but it assumes a variety of secondary forms. It has a styptic metallic taste. It is soluble in three times its weight of water at 212°, and in fifteen at 60°. As this statement of its solubility is very different from that of most writers, from Bergmann to Fourcroy, who say, that it requires 80 parts of water at 60°, and somewhat less than 40 of boiling water, it is necessary to mention, that it was ascertained by careful experiment, with very fine crystals of tartar-emetic, more than half an inch in length, and perfectly free from the admixture of any foreign salt. The crystals, by exposure to the air, become white and opaque, but do not readily fall to powder. The property of deliquescing, ascribed to them by Göttling, must have arisen from the presence of other salts, as he does not prepare his tartar-emetic by crystallization, but by evaporating the solution to dryness. The solution of tartar-emetic slightly reddens tincture of turnsole. It is decomposed by acids, alkalies, alkaline carbonates, sulphuretted hydrogen and its compounds, vegetable juices, decoctions, and infusions, and many of the metals.

According to Thenard, tartar-emetic consists of tartrate of antimony 54, tartrate of potass 34, water 8, and loss 4; or, oxide of antimony 38, tartaric acid 34, potass 16, water and loss 12; and by estimation from the analysis of tartrate of potass, and super-tartrate of potass, by the same chemist, it appears, that to saturate 38 parts of protoxide of antimony, 70.4 of super-tartrate of potass are necessary: the whole of the superfluous acid, being 16, combines with the oxide, while 34 of the tartrate of potass combine with the tartrate of antimony thus formed, and 20.4 of tartrate of potass remain in solution in the mother water.

I have been thus particular in the account of the preparation and chemical properties of tartar-emetic, because it is not only of all the preparations of antimony the most certain in its operation, but is almost indispensable for the successful practice of medicine.

Medical use.—In doses of from one to three grains it operates as an emetic, and sometimes as a cathartic. In smaller doses, it excites nausea, and proves a powerful diaphoretic and expectorant. As an emetic, it is chiefly given in the beginning of fevers and febrile diseases, in chincough, and, in general, whenever we wish to evacuate the stomach quickly. When great debility is present, and in the advanced stages of typhoid fever, its use is improper, and even sometimes fatal. As a diaphoretic, it is given in small doses, of from an eighth to a quarter of a grain; and as an expectorant, in doses still smaller.

The only proper form for exhibiting it is in solution; and as the intensity of its action on the body is liable to variation, from differences in its own strength, and in the constitution of the patient, it should almost always be given in divided doses, at short intervals, if we wish to excite vomiting; and at longer intervals, if we wish it to act only on the skin or lungs.

VINUM TARTRITIS ANTIMONII, olim VINUM ANTIMONIALE. *Ed.*

Wine of Tartrite of Antimony, formerly *Antimonial Wine*.

Take of
Tartrite of antimony, twenty-four grains;
Spanish white wine, one pound.
Mix them, so that the tartrite of antimony may be dissolved.

LIQUOR ANTIMONII TARTARIZATI. *Lond.*

Solution of Tartarized Antimony.

Take of
Tartarized antimony, a scruple;
Boiling distilled water, four fluidounces;
Wine, six fluidounces.

Dissolve the tartarized antimony in the boiling distilled water; then add the wine.

FORMERLY antimonial wine was a fortuitous preparation, by steeping glass of antimony in white wine; a portion of the glass of antimony was dissolved by the super-tartrate of potass contained in the wine; and as the quantity of this is variable, so also the quantity of oxide of antimony dissolved varied: and, therefore, the preparation is with propriety entirely rejected, since its strength could never be known. It was also formerly to be regretted, that the strength of the solutions of tartar-emetic in wine, as prescribed by the different colleges, was not uniform. According to the Edinburgh college, one ounce contained two grains of tartar-emetic, while, according to the London, it contained four grains.

In its employments and effects, the vinous solution of tartar-emetic does not differ from one made with water.

CHAP. VI.—SILVER.

NITRAS ARGENTI. *Ed.*

Nitrate of Silver.

Take of
- Purest silver, flatted into plates, and cut in pieces, four ounces;
- Diluted nitrous acid, eight ounces;
- Distilled water, four ounces.

Dissolve the silver in a matrass with a gentle heat, and evaporate the solution to dryness. Then put the mass into a large crucible, and place it on the fire, which should at first be gentle, and afterward increased by degrees till the mass flows like oil; then pour it into iron pipes, previously heated and anointed with tallow. Lastly, keep it in a glass vessel well corked.

Dub.

Take of
- Silver, flatted into plates, and cut in pieces,
- Nitrous acid, of each one ounce by weight;
- Distilled water, two ounces by measure.

Put the silver in a glass phial, placed in a sand bath, and pour on the acid, previously diluted with the water; then, gradually increasing the heat, dissolve the metal, and evaporate the liquor to dryness. Liquefy the mass which remains, in a crucible, over a slow fire. Form it into proper shapes, and keep it in a glass vessel well shut.

Lond.

Take of
Silver, one ounce;
Nitric acid, a fluidounce and a half;
Distilled water, two fluidounces.

Mix the nitric acid with the water, and dissolve the silver in the mixture in a sand bath. Then gradually increase the heat, to dry the nitrate of silver. Melt this in a crucible with a gentle fire, until the water being expelled it cease to boil; then immediately form it into proper moulds.

THE acid employed must be very pure. If it contain, as the acid of commerce always does, sulphuric or muriatic acid, these re-act upon the nitrate as soon as it is formed, and a white precipitate, consisting of sulphate and muriate of silver, falls to the bottom.

The method which the refiners employ for examining the purity of their aquafortis (the name they give to dilute nitrous acid), and purifying it, if necessary, is to let fall into it a few drops of a solution of nitrate of silver already made; if the liquor remain clear, it is fit for use: otherwise, they add a small quantity more of the solution, which immediately turns the whole of a milky white colour; the mixture being then suffered to rest for some time, deposites a white sediment, from which it is cautiously decanted, examined again, and, if necessary, farther purified by a fresh addition of this solution.

It is necessary to employ very pure water in this process, for the muriates and earthy salts which common water generally contain, precipitate part of the silver in a state of a muriate or oxide. If distilled water be not used, the water should be added to the acid before it be tried, and purified by the nitrate of silver.

The solution will go on the more speedily, if the silver, flatted into thin plates, be rolled loosely up, so that the several surfaces do not touch each other. By this management, a greater extent of the surface is exposed to the action of the menstruum, than when the plates are cut in pieces and laid above each other. If the silver be alloyed with copper, the solution will have a permanent greenish blue colour, and acquire a bright blue on the addition of ammonia. If it contain gold, the gold is not dissolved, but is found at the bottom of the solution, in the form of a black or deep purple powder.

The crucible ought to be of porcelain; as, with the common crucibles, the loss arising from the nitrate of silver sinking into their substance is too great. It ought also to be large enough to hold five or six times the quantity of the dry matter; for it bubbles and swells up greatly, so as to be apt to run over. During the evaporation, also, little drops are now and then spirted up, whose causticity is increased by their heat, against which the operator ought therefore to be on his guard. The fire must be kept moderate till this ebullition ceases, and till the matter becomes consistent in the heat that made it boil before: the fire is then to be quickly increased, till the matter flows thin at the bottom like oil, on which it is to be immediately poured into the mould; for if the heat be continued after this, the nitrate of silver begins to be decomposed, and the silver is reduced.

The mould should be of iron, or one may be formed in a mass of tempered tobacco pipe clay, not too moist, by making, with a smooth stick, previously greased, a sufficient number of holes. Each piece is to be wiped clean from the grease, and wrapt up in soft dry paper, not only to keep the air from acting upon them, but likewise to prevent their corroding or discolouring the fingers in handling.

Nitrate of silver is crystallizable. Its crystals are brilliant plates, having a variable number of sides. Their taste is austere, and intensely bitter. They are very soluble in water, but permanent in the air, and not deliquescent. They are decomposed by heat, light, phosphorus, charcoal, many metals, all the alkalies and earths, sulphuric, muriatic, phosphoric, and fluoric acids, and by the salts they form. When deprived of water, and melted according to the directions of the colleges, it forms a black or dark grey-coloured mass, hard, sonorous, and consisting of radii, diverging from the centre. It is not deliquescent when free from copper, which is seldom the case. It may, however, be prepared perfectly pure, even from a solution containing copper, by evaporating and crystallizing it as long as it furnishes firm tabular crystals. These are then to be washed with a little distilled water, and melted with a gentle heat. The nitrate of copper remains in the mother water, from which the silver it contains may be precipitated by muriatic acid.

Medical use.—A strong solution of nitrate of silver corrodes and decomposes animal substances: in a more diluted state, it stains them of an indelible black; and, for this purpose, it is now used as an indelible marking ink. The fused nitrate of silver is the strongest and most manageable caustic we possess, and is employed to remove fungous excrescences, callous edges, warts, strictures in the urethra, and the like. It is also used to destroy the venereal poison in chancres, before it has acted on the system. A weak solution of it may be applied, as a stimulus, to indolent ulcers, or injected into fistulous sores.

Notwithstanding its causticity, it has been given internally. Boerhaave, Boyle, and others, commend it highly in hydropic cases. The former assures us that, made into pills with crumb of bread and a little sugar, and taken on an empty stomach (some warm water, sweetened with honey, being drank immediately after), it purges gently, without griping, and brings away a large quantity of water, almost without the patient's perceiving it: that it kills worms, and cures inveterate ulcerous disorders. He, nevertheless, cautions against using it too frequently, or in too large a dose; and observes, that it always proves corrosive and weakening to the stomach.

It has been more recently employed, and with success, in epilepsy and angina pectoris. On account of its very great activity, each pill should not contain above one eighth or one fourth of a grain.

CHAP. VII.—ARSENIC.

ARSENICI OXYDUM PRÆPARATUM.—*Lond.*
Prepared Oxide of Arsenic.

Reduce oxide of arsenic to powder; then put it into a crucible; expose it to the fire, and sublime it into another crucible inverted over the first.

THE white oxide of arsenic of commerce is obtained as an insignificant product in roasting cobalt ores, and is therefore often impure. By sublimation, however, it is easily separated from foreign matters, but the operator must be very careful to avoid the fumes which arise during the process.

LIQUOR ARSENICALIS. *Lond.*
Arsenical Solution.

Take of
Prepared oxide of arsenic, in very fine powder;
Subcarbonate of potass from tartar, of each sixty-four grains;
Distilled water, a pint.

Boil together in a glass vessel, until the arsenic be entirely dissolved. Add to the solution, when cold,

Compound spirit of lavender, four fluiddrachms.

Lastly, as much distilled water as will make the whole amount exactly to a pint.

ARSENIAS KALI. *Dub.*

Arseniate of Kali.

Take of

White oxide of arsenic,

Nitrate of kali, of each one ounce.

Reduce them separately to powder; and, after mixing them, introduce them into a glass retort, placed in a sand bath, which is to be gradually heated, until the bottom of the retort become obscurely red. It is expedient to transmit the vapours issuing from the retort, by means of a proper apparatus, through distilled water, that the nitrous acid extricated by the heat may be condensed. Dissolve the residuum in four pounds of boiling distilled water; and, after due evaporation, set it aside to crystallize.

The preparation of the London college is a solution of arsenite of potass, and corresponds with Dr. Fowler's tasteless ague-drop. The spirit of lavender is added merely to prevent its being mistaken for water, an accident which might happen from its want of colour and taste. Now that arsenic is so much used, it is useful to have an officinal solution of an uniform strength. Dr. Powell has justly observed, that " where the dose is small, and the effects so powerful, the most minute attention to its proportion and preparation become necessary;" and yet he actually falls into the very dangerous error of stating, that a drachm of the solution contains one eighth of a grain of oxide, whereas it contains one half of a grain, and specifics half a drachm of the solution as the maximum dose, under the idea that it contains only one sixteenth of a grain, whereas it contains four times that quantity.

The Dublin preparation is crystallized arseniate of potass. On the application of the heat, the nitric acid of the nitre is decomposed, the oxygen combines with the oxide of arsenic, and converts into arsenic acid, which unites with the potass, and nitrous gas and red nitrous acid escape. I should not think the latter of sufficient importance to be condensed as directed by the Dublin college.

CHAP. VIII.—COPPER.

ÆRUGO PRÆPARATA. *Dub.*
Prepared Verdegris.

Let the verdegris be ground to powder, and the minute particles be separated in the manner directed for the preparation of chalk.

THE intention of this process is merely to obtain the subacetate of copper in the state of the most minute mechanical division.

SOLUTIO SULPHATIS CUPRI COMPOSITA, olim AQUA STYPTICA. *Ed.*
Compound Solution of Sulphate of Copper, formerly *Styptic Water.*

Take of
Sulphate of copper,
Sulphate of alumina, each three ounces;
Water, two pounds;
Diluted sulphuric acid, an ounce and a half.

Boil the sulphates in the water, to dissolve them, and then add the acid to the liquor, filtered through paper.

IN this preparation, the substances dissolved in the water exert no chemical action on each other, and the composition was probably contrived, from the false idea, that the sum of the powers of substances having similar virtues, was increased by mixing them with each other.

Medical use.—It is chiefly used as a styptic for stopping bleedings at the nose; and, for this purpose, cloths, or dossils, steeped in the liquor, are to be applied to the part.

AMMONIARETUM CUPRI, olim CUPRUM AMMONIACUM. *Edin.*
Ammoniaret of Copper, formerly *Ammoniacal Copper.*

Take of
Pure sulphate of copper, two parts;
Carbonate of ammonia, three parts;

Rub them carefully together in a glass mortar, until, after the effervescence has entirely ceased, they unite into a violet-coloured mass, which must be wrapped up in blotting paper, and first dried on a chalk-stone, and afterwards by a gentle heat. The product must be kept in a glass phial, well corked.

CUPRUM AMMONIATUM. *Dub.*
Ammoniated Copper.

Take of
Sulphate of copper, one ounce;
Carbonate of ammonia, an ounce and a half.

Triturate them in an earthen-ware mortar, until, after the effervescence has entirely ceased, they unite into a mass, which is to be wrapped up in bibulous paper, dried, and kept in a phial, closed with a glass stopper.

Lond.

Take of
Sulphate of copper, half an ounce;
Sub-carbonate of ammonia, six drachms.

Rub them together in a glass mortar until the effervescence cease; then dry the ammoniated copper, wrapped up in blotting paper, with a gentle heat.

IT may seem strange, that particular directions should be given concerning the manner of drying a mixture, which is prepared by rubbing two dry substances together. But such a phenomenon is by no means uncommon, and arises from the quantity of water of crystallization contained in the ingredients being greater than what is required in the new compound formed: as soon, therefore, as the ingredients begin to act upon each other, a quantity of water is set at liberty, which renders the mass moist.

The nature of this compound, and consequently the name which should be given it, are not yet sufficiently ascertained. Prepared according to the directions of the colleges, it evidently contains oxide of copper, ammonia, and sulphuric acid. If these substances be chemically combined, it should be denominated the Sulphate or Sub-sulphate of copper and ammonia. By the exposure to the air during its exsiccation, and by keeping, it is apt to lose its blue colour entirely, and become green, and is probably converted into carbonate of copper. It should therefore be prepared in small quantities at a time.

Medical use.—Ammoniaret of copper has been strongly recommended in epilepsy; but, from its good effects sometimes ceasing after it has been used for some time, a want of success, in some cases, and the disagreeable consequences with which its use is sometimes attended, it has not lately been much prescribed. In my practice, however, its success has been almost uniform, and often astonishing. It is employed by beginning with doses of half a grain twice a-day, and increasing them gradually to as much as the stomach will bear. Dr. Cullen sometimes increased the dose to five grains.

AQUA CUPRI AMMONIATI. *Dub.*
Water of Ammoniated Copper.

Take of
- Lime water, eight ounces, by measure;
- Muriate of ammonia, two scruples;
- Verdegris prepared, four grains.

Mix and digest them for twenty-four hours, then pour off the pure liquor.

LIQUOR CUPRI AMMONIATI. *Lond.*
Solution of Ammoniated Copper.

Take of
- Ammoniated copper, one drachm;
- Distilled water, one pint.

Dissolve the ammoniated copper in the water, and filter through paper.

In the Dublin preparation, the lime-water decomposes the muriate of ammonia, and forms muriate of lime; while the ammonia, disengaged, immediately re-acts upon the oxide of copper contained in the verdegris, and renders it soluble. The mode of preparing this solution, now adopted by the London college, has the great merit of simplicity.

Medical use.—This solution is applied externally for cleaning foul ulcers, and disposing them to heal. It has been recommended also for taking off specks and films from the eyes; but, when used with this intention, it ought to be diluted with some pure water, as, in the degree of strength in which it is here ordered, it irritates and inflames the eyes considerably. It is the readiest, and perhaps the most delicate, test of arsenic, by which its blue colour is converted into green.

CHAP. IX.—IRON.

FERRI LIMATURA PURIFICATA. *Ed.*
Purified Filings of Iron.

Place a sieve over the filings, and apply a magnet, so that the filings may be attracted upwards through the sieve.

This process does not fulfil the purpose for which it is intended; for the adhesion of a very small particle of iron renders brass and other metals attractable by the magnet. The filings of iron, got from the shops of different artificers, which are always mixed with solder, and other metals, cannot be purified in this way, so as to render them fit for internal use; and, indeed, the only way they can be obtained sufficiently pure, is by filing a piece of pure iron with a clean file.

FERRI OXIDUM NIGRUM PURIFICATUM, olim FERRI SQUAMÆ PURIFICATÆ *Ed.*

Purified Black Oxide of Iron, formerly *Purified Scales of Iron.*

Let the scales of the oxide of iron, which are to be found at the foot of the blacksmith's anvil, be purified by the application of a magnet; for the magnet will attract the smaller and purer scales, and will leave those which are larger and less pure.

OXYDUM FERRI NIGRUM. *Dub.*

Black Oxyde of Iron.

Separate the scales of oxyde of iron, gathered at a blacksmith's forge, from impurities, by applying the magnet. Then reduce them to powder, of which the finest particles are to be collected, for the manner directed in the preparation of chalk.

HERE the application of the magnet is useful, because these scales contain no foreign metal, but are mixed with earthy and other impurities, which could be separated in no other way. The Prussian Dispensatory direct this oxide to be prepared by moistening the carbonate of iron with olive oil, distilling it to dryness in a retort, and heating it almost to redness. The iron, in this process, is reduced from the state of peroxide to that of protoxide.

CARBONAS FERRI, olim FERRI RUBIGO. *Ed.*

Carbonate of Iron, formerly *Rust of Iron.*

Moisten purified filings of iron frequently with water, that they may be converted into rust, which is to be ground into an impalpable powder.

Dub.

Take of

Iron wire, any quantity.

Cut it into pieces, which are to be moistened frequently with water, and exposed to the air until they be corroded into rust. Then triturate them in an iron mortar, and by pouring water upon them, wash over the finest part of the powder, which is to be dried.

Iron is one of the most easily oxidized of the metals. By exposure at the same time to air and moisture, it is very quickly oxidized, while it also absorbs carbonic acid, and is converted into a reddish brown pulverulent substance, well known by the name of rust of iron. For medical use it is prepared as the other substances insoluble in water.

CARBONAS FERRI PRÆCIPITATUS. *Ed.*
Carbonas Ferri. *Dub.*
Precipitated Carbonate of Iron.

Take of
  Sulphate of iron, four ounces;
  Carbonate of soda, five ounces;
  Water, ten pints.

Dissolve the sulphate in the water, and add the carbonate of soda, previously dissolved in a sufficient quantity of water, and mix them thoroughly.

Wash the carbonate of iron, which is precipitated, with warm water, and afterwards dry it.

Carbonas Ferri. *Lond.*
Carbonate of Iron.

Take of
  Sulphate of iron, eight ounces;
  Subcarbonate of soda, ten ounces;
  Boiling water, a gallon.

Dissolve the sulphate of iron and subcarbonate of soda separately, each in four pints of the water; then mix the solutions, and set aside until the precipitate subside; then having poured off the supernatant liquor, wash the carbonate of iron with warm water, and dry it, wrapped up in bibulous paper, with a gentle heat.

On mixing the solutions of these salts together, there is an immediate mutual decomposition. Sulphate of soda is formed, which remains in solution, and carbonate of iron, which is precipitated of a green colour. The precipitate, when first formed, is the carbonate of black oxide of iron, or contains the iron in the state of protoxide, the state in which it exists in the green sulphate of iron; but in the process of drying, it absorbs more oxygen, becomes of a red colour, and is converted into the carbonate of red oxide of iron. As the precipitate is extremely light and bulky, it is not easily separated by allowing it to subside, and pouring off the clear liquor; filtration should therefore be employed. The carbonate of soda is used in preference to the carbonate of potass, on account of the greater solubility of sulphate of soda than of sulphate of potass, which renders the subsequent ablution of the salt more

Medical use.—The carbonate of iron is an excellent and safe chalybeate. It may be given in doses of from five grains to sixty; but all chalybeates answer better in small doses, frequently repeated, than in large doses.

SULPHAS FERRI. *Ed.*
Sulphate of Iron.

Take of
Purified filings of iron, six ounces;
Sulphuric acid, eight ounces;
Water, two pounds and a half.

Mix them, and after the effervescence ceases, digest the mixture for some time upon warm sand; then strain the liquor through paper, and, after due evaporation, set it aside to crystallize.

Dub.

Take of
Iron wire, two ounces;
Sulphuric acid, three ounces and a half, by weight;
Water, one pint.

Mix the acid by degrees with the water, in a glass vessel, and gradually add the iron wire, cut into pieces: digest the mixture till the metal be dissolved, and strain the liquor through paper. Lastly, set aside the liquor, after due evaporation, to crystallize by slow refrigeration.

Lond.

Take of
Iron,
Sulphuric acid, each eight ounces;
Water, four pints.

Mix the sulphuric acid with the water in a glass vessel, and add the iron; then, when the effervescence has ceased, strain the solution through paper, and after due evaporation, set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

Sulphate of iron cannot be procured perfectly pure, except by the direct union of sulphuric acid and iron; and as it is of consequence that it should be pure when administered internally, directions for its preparation have been given by all the colleges. The differences which may be observed in the proportions of the materials employed, is of little consequence, as sulphuric acid and iron unite only in one proportion.

Iron scarcely acts upon sulphuric acid, unless assisted by heat. It then becomes oxidized, by abstracting oxygen from a portion of the acid, and converting it into sulphureous acid gas or sulphur, and combines with the remainder of the acid. But it acts with great rapidity on diluted sulphuric acid; in which case it is not oxidized at the expence of the acid itself, but by decomposing the water, and therefore the hydrogen of the water is separated in the form of gas. The action of the acid and iron upon each other often ceases before the acid is nearly saturated, and may be renewed by the addition of a little water. The reason is, that all the water which was not decomposed, is employed to dissolve the sulphate of iron formed.

The properties and uses of sulphate of iron have been already mentioned.

SULPHAS FERRI EXSICCATUS. *Ed.*

Dried Sulphate of Iron.

Take of

Sulphate of iron, any quantity.

Expose it to the action of a moderate heat in an unglazed earthen vessel, until it become white and perfectly dry.

SULPHAS FERRI EXSICCATUM. *Dub.*

Dried Sulphate of Iron.

Take of

Sulphate of iron, any quantity.

Let it whiten by exposing it in an unglazed earthen vessel, to a high temperature (200° to 212° Fahr.)

The heat applied here must not be so great as to decompose the sulphate of iron, but only to deprive it of its water of crystallization.

OXIDUM FERRI RUBRUM. *Ed.*

Red Oxide of Iron.

Expose dried sulphate of iron to an intense heat, until it is converted into a very red substance.

Dub.

Roast with an intense heat dried sulphate of iron until it become very red. Then wash it, until, according to the test of lithmus, the water decanted from it be free of acid; lastly, dry it on blotting paper.

By the violent heat applied in this preparation, the sulphate of iron is completely decomposed, and copious white fumes are expelled. The iron is converted into the red oxide; part of the sulphuric acid is therefore reduced to the state of sulphureous acid, and the rest of the acid is expelled in a very concentrated state. This process was formerly employed in this country, and still is in Germany, for the preparation of sulphuric acid; which, however, from the presence of the sulphureous acid, is possessed of some peculiar properties, such as emitting fumes and crystallizing.

The residuum is composed of red oxide of iron, combined with a little red sulphate of iron, which renders it deliquescent. To obtain the oxide perfectly pure, the residuum must therefore be washed with water, and dried quickly, to prevent the absorption of carbonic acid.

TINCTURA MURIATIS FERRI. *Ed.*

Tincture of Muriate of Iron.

Take of

Purified black oxide of iron in powder, three ounces;
Muriatic acid, about ten ounces, or as much as may be sufficient to dissolve the powder.

Digest by a gentle heat, and after the powder is dissolved, add of alcohol, as much as will make the whole quantity of liquor amount to two pounds and a half.

Dub. and Lond.

Take of

Carbonate of iron, half a pound;
Muriatic acid, a pint;
Rectified spirit, three pints.

Pour the muriatic acid on the carbonate of iron in a glass vessel; and shake the mixture now and then during three days. Then set it by, that the fæces, if any, may subside, and pour off the liquor (evaporate this to one pint slowly, *Dub.*); and when cold, add the spirit.

TINCTURA MURIATIS FERRI CUM OXYDO RUBRO. *Dub.*

Tincture of Muriate of Iron with the Red Oxide.

Take of

Red oxide of iron, one ounce;
Muriatic acid, four ounces by measure;
Rectified spirit of wine, the requisite quantity.

Digest the oxide with the acid for twenty-four hours, then boil for half an hour. Evaporate the filtered liquor to the thickness of syrup, and when cold, add rectified spirit of wine, with frequent agitation, until the tincture acquire the specific gravity of 1050.

In making this preparation, the colleges use iron in a different state; the Edinburgh, the black oxide; and the London and Dublin colleges, the carbonate of the red oxide. Muriatic acid is capable of combining either with the black or red oxides of iron, and forms with each, salts, having distinctive properties.

The red muriate of iron is not crystallizable; has a dark orange colour; is deliquescent; forms a brown red solution, having a very astringent taste; and is soluble in alcohol. The green muriate is crystallizable; has little colour; is very soluble in water, forming a pale green solution; and is insoluble in alcohol. But the aqueous solution of green muriate attracts oxygen so rapidly from the atmosphere, that unless the access of the air be totally excluded, it is always partially converted into red muriate. The solutions of iron, and of its black oxide, are accordingly found always to contain a greater or less proportion of red muriate, and are therefore not uniform or constant in their properties. Besides, as it is only the red muriate which is soluble in alcohol, it appears to us that it is better, according to the directions of the London and Dublin colleges, to use the red carbonate of iron, by which means we obtain an unmixed and permanent solution of the red muriate. Muriate of iron is also formed, when we dissolve the sulphuret of iron in muriatic acid for the purpose of procuring sulphuretted hydrogen gas. It is also the residuum which remains in the retort after the sublimation of muriate of ammonia and iron. I must confess that I do not see the use of introducing, as the Dublin college has done, two receipts for this preparation.

When well prepared, the alcoholic solution of muriate of iron has a yellowish colour, and very astringent taste. It is an excellent chalybeate, and may be given in doses of ten or twenty drops twice or thrice a-day, in any proper vehicle.

MURIAS AMMONIÆ ET FERRI, olim FLORES MARTIALES. *Ed. Dub.*

Muriate of Ammonia and Iron, formerly *Martial Flowers.*

Take of
'Red oxide of iron (washed and again dried. *Ed.*)
Muriate of ammonia, equal weights.
Mix them thoroughly, and sublime (with a sudden and sufficiently great degree of heat. *Dub.*)

FERRUM AMMONIATUM. *Lond.*

Ammoniated Iron.

Take of
Carbonate of iron;
Muriate of ammonia, of each one pound.

Mix them accurate; and instantly sublime, by the application of a quick fire; lastly, reduce to powder.

ALTHOUGH at a low temperature, ammonia decomposes the muriate of iron, at a high temperature, iron and its oxides decompose muriate of ammonia. But as muriate of ammonia is itself a volatile salt, great part of it escapes undecomposed; so that the product is a mixture of muriate of ammonia with red muriate of iron. According to the formula of all the colleges, the decomposition is effected by simple affinity. As soon as the oxide of iron acts on the muriate of ammonia, the ammonia which is separated comes over: then, as the heat increases, undecomposed muriate of ammonia is sublimed; which, as the process advances, is mixed with an increasing proportion of muriate of iron. In the former process of the London college, the decomposition was more complex; and a considerable quantity of hydrogen gas was produced. The colleges employ a much larger quantity of iron than is necessary. According to the German pharmaceutists, if the iron be equal to one sixteenth of the muriate of ammonia, it is sufficient. The new Prussian Dispensatory directs one ounce of iron to be dissolved in a mixture of two parts of muriatic acid, and one of nitrous acid; this solution of red muriate of iron to be mixed with twelve ounces of muriate of ammonia, and the whole evaporated to dryness; and the dry mass to be sublimed in a wide-necked retort, with a heat increased to redness.

Whatever process be employed, the heat must be applied as quickly as possible; and the sublimed product thoroughly mixed by trituration, and kept in well stopped glass vessels. It should have a deep orange colour, and a smell resembling saffron, and should deliquesce in the air.

Medical use:—This preparation is supposed to be highly aperient and attenuating; though no otherwise so than the rest of the chalybeates, or at most only by virtue of the saline matter joined to the iron. It has been found of service in hysterical and hypocondriacal cases, and in distempers proceeding from a laxity and weakness of the solids, as the rickets. From two or three grains to ten may be conveniently taken in the form of a bolus.

TINCTURA FERRI AMMONIATI. *Lond.*

Tincture of Ammoniated Iron.

Take of

Ammoniated iron, four ounces;
Proof spirit, one pint.

Macerate and strain.

THIS is merely a spiritous solution of the preceding article, and is a much less elegant medicine than the simple tincture of muriate of iron.

FERRUM TARTARISATUM. *Lond.*
Tartarized Iron.

Take of
Iron, one pound;
Supertartrate of potass, in powder, two pounds.
Water, one pint.

Triturate them together, and expose to the action of the air for eight days in a wide glass vessel; then grind the matter, after being dried in a sand bath, to a very minute powder. Add another pint of water to this powder, and set it aside for eight days; then dry the mass, and powder it again.

TARTARUM FERRI. *Dub.*
Tartar of Iron.

Take of
Carbonate of iron, half an ounce;
Crystals of tartar, in very fine powder, one ounce;
Distilled water, a pint.

Boil them together in a glass vessel over a slow fire for an hour, and filter the liquor through paper. When cool, and filtered a second time, evaporate it until a pellicle appears on the surface. In cooling, it will form a saline mass, which is to be powdered, and kept in close vessels.

THIS is in fact a triple tartrate of iron and potass, the excess of acid in the super-tartrate of potass being saturated by oxide of iron. In the Dublin process the combination is direct; in that of the London college, the iron is oxidized during the process, in which it is moistened and exposed to the action of the air.

The compound, according to Thenard, is very soluble, varies in colour according to the state of the oxide; crystallizes in small needles, and has a chalybeate taste. It is not precipitated by alkalies or alkaline carbonates. It is decomposed by sulphuretted hydrogen, and its compounds, and by gallic acid.

The tartrate of iron and potass may be given in the form of powder or bolus, in doses of from ten to thirty grains.

VINUM FERRI. *Lond.*
Wine of Iron.

Take of
Iron filings, two ounces;
Spainsh white wine, two pints.

Mix and set aside for a month, often shaking the vessel, and then filter through paper.

Dub.

Take of
Iron wire cut in pieces, four ounces;
White Rhenish wine, four pints.
Sprinkle the iron with a bottle of the wine, and expose it to the air until it be covered with rust; then add the rest of the wine; digest for seven days, with occasional agitation, and filter.

This is merely a solution of the preceding article in wine; for the iron is only dissolved in the wine by means of the super-tartrate of potass it contains. The Rhenish wine directed by the Dublin college will, therefore, dissolve a larger quantity of iron than the Spanish white wine of the London college But a solution of a known proportion of the preceding article in wine, will give a medicine of more equal powers, and may be made extemporaneously.

The dose is from a drachm to half an ounce, repeated twice or thrice a-day in chlorotic cases.

ACETAS FERRI. *Dub.*

Acetate of Iron.

Take of
Carbonate of iron, half an ounce;
Acetic acid, three ounces by measure.
Digest for three days, and strain.

TINCTURA ACETATIS FERRI. *Dub.*

Tincture of Acetate of Iron.

Take of
Acetate of kali, two ounces;
Sulphate of iron, one ounce;
Rectified spirit of wine, two pints.
Rub the acetate of kali and sulphate of iron in an earthen-ware mortar, until they unite into a soft mass; then dry it with a moderate heat, and triturate it, when dried, with the spirit. Digest the mixture in a well corked phial for seven days, shaking it occasionally. Lastly, after the fæces have subsided, pour off the limpid liquor

THE acetic acid is capable of combining with both oxides of iron; and as the iron in the sulphate is in the state of black oxide, which has a strong attraction for oxygen, it is probable that the acetate prepared in the way directed is a mixed acetate.

It has an extremely styptic taste, and is given in doses of thirty or forty drops.

TINCTURA ACETATIS FERRI CUM ALCOHOL. *Dub.*

Tincture of Acetate of Iron with Alcohol.

Is prepared exactly as the preceding tincture, with the substitution of one pint of alcohol for the two pints of rectified spirit.

This is probably an unmixed tincture of acetate of potass and red oxide of iron, as alcohol is incapable of dissolving the green salts of iron, but dissolves the red salts readily.

LIQUOR FERRI ALKALINI. *Lond.*

Solution of Alkaline Iron.

Take of
Iron, two drachms and a half;
Nitric acid, two fluidounces;
Distilled water, six fluidounces;
Solution of sub-carbonate of potass, six fluidounces.

Mix the water and acid, and pour them upon the iron. As soon as the effervescence has ceased, pour off the acid solution; add to this gradually, and at intervals, the solution of sub-carbonate of potass, shaking it occasionally, until, after having become of a dark red colour, no more effervescence be excited. Lastly, let it stand for six hours, and pour off the solution.

This preparation of iron is so entirely different from all others in its nature, that we think the London college right in introducing it into their Pharmacopœia. The chemical nature of the composition has not been accurately ascertained, and the preparation is attended with some difficulty and uncertainty. Dr. Powell says, that the solution of the iron should be made very slowly, and that it ought not to be nearly saturated, but have a considerable superabundance of acid. It ought to be clear, and slightly greenish, and if by excess of iron, it have a reddish yellow colour, a little acid is to be added, which will bring it to the proper state. The solutions must be added gradually to each other, and Dr. Powell says, that although the proportions are pretty nearly given, they require to be checked by occasional examination, especially by the taste, which should be slightly alkalescent. He also adds, that after standing, nitrate of potass generally crystallized, from which the clear deep red solution is to be poured off. Hagen says, that the preparation does not succeed with caustic potass; and that the more it is carbonated, the better. This preparation has not yet been investigated by chemists, with the attention it deserves. It is not very obvious why the acid should be in such excess, when it is afterwards to be saturated by an alkali; nor why a carbonated alkali succeeds better than a caustic one. Does the carbonic acid perform a principal part in redissolving the chalybeate precipitate? Does the excess of acid operate by disengaging a larger quantity of carbonic acid from the large quantity of alkali necessary to saturate it?

CHAP. X.—MERCURY.

HYDRAGYRUM PURIFICATUM. *Dub.*

Purified Quicksilver.

Take of
  Quicksilver, six pounds.
Draw off four pounds by slow distillation.

HYDRAGYRUS PURIFICATUS. *Lond.*

Purified Quicksilver.

Take of
  Quicksilver, six pounds.
  Iron filings, one pound.
Rub them together, and distil the quicksilver from an iron retort.

Edin.

Take of
  Quicksilver, four parts;
  Filings of iron, one part.
Rub them together, and distil from an iron vessel.

THE quicksilver of commerce is often adulterated with lead, tin, or other metals, which renders it unfit for internal use, and for many preparations. It therefore becomes necessary to purify it, and, fortunately, its comparatively great volatility supplies us with an easy process. The Dublin college distil it simply without any addition; but, lest towards the end of the process the mercury should elevate any impurities along with it, they draw off but two thirds. The principal objection to this process is the want of economy; for although the remaining third may be used for some purposes, its value is very much depreciated. As iron has a much stronger affinity for almost all the substances with which quicksilver may be adulterated, than quicksilver has, by adding iron filings we may draw off the whole quicksilver by distillation, without any fear of the impurities rising along with it.

Glass retorts are inadmissible in this distillation; because, when the mercury begins to boil, the concussion is so great, that they would certainly be broken. Iron retorts are the best, although strong earthen ones may also be used. The receiver may be of the same materials, or of glass, if we wish to inspect the progress of the operation; but, in this case, we must interpose an adopter between the retort and receiver, and fill the receiver nearly full of water, that the mercury may not crack it, by falling hot into it. The retort employed should be so large, that the quicksilver should not fill above one third of it.

ACETIS HYDRARGYRI. *Ed.*

Acetite of Quicksilver.

Take of

Purified quicksilver, three ounces;
Diluted nitrous acid, four ounces and a half, or a little more than may be required for dissolving the mercury;
Acetite of potass, three ounces;
Boiling water, eight pounds.

Mix the quicksilver with the diluted nitrous acid; and after the effervescence has ceased, digest, if necessary, with a gentle heat, until the quicksilver be entirely dissolved. Then dissolve the acetate of potass in the boiling water, and immediately to this solution, still hot, add the former, and mix them by agitation. Then set the mixture aside to crystallize. Place the crystals in a funnel, and wash them with cold distilled water; and, lastly, dry them with as gentle a heat as possible.

ACETAS HYDRAGYRI. *Dub.*

Acetate of Quicksilver.

Take of

Purified quicksilver, three ounces, by weight;
Diluted nitrous acid, three ounces, by measure;
Acetate of kali, three ounces;
Boiling distilled water, eight pints.

Add the acid to the quicksilver; and, after the effervescence has ceased, digest upon hot sand, that the metal may be dissolved. Instantly mix the liquor with the boiling water, in which the acetate of kali has been previously dissolved, and filter, as quickly as possible, through double linen. Let it form crys-

tals by cooling, which, after being washed in cold distilled water, are to be dried on paper, with a very gentle heat.
In the whole of this process, glass vessels are to be used.

THESE processes are fundamentally the same. They differ chiefly in the proportions. Those of the Edinburgh college were ascertained by very careful experiment; and if its directions be accurately followed, the preparation succeeds admirably. Nitrate of mercury is decomposed by acetate of potass; and the products are, acetate of mercury and nitrate of potass. The nitrate of potass, being much more soluble than the acetate of mercury, remains in solution after the latter is separated by crystallization. Mercury is capable of forming different combinations with nitrous acid. When we employ a sufficient quantity of acid to dissolve the mercury without the assistance of heat, and to retain it in solution, there is always an excess of acid, and therefore it is a solution of super-nitrate of mercury. If we evaporate this solution very gently, or, if we add an additional quantity of mercury, and assist the action of the acid by a gentle heat, until nitrous gas begin to escape, we obtain nitrate of mercury, crystallized in various forms. In these, the mercury is in a state of protoxide. But, if we assist the action of the acid by boiling, until nitrous gas ceases to escape, the mercury is converted into peroxide, and a larger quantity is dissolved. This solution is very apt to crystallize, both on cooling, and by the diminution of the quantity of acid during the process; and if we attempt to dilute the solution with water, a copious precipitate of sub-nitrate of mercury immediately takes place; and the solution contains super-nitrate of mercury. If the dilution be made with cold water, the sub-nitrate has a white colour, which, by a very slight application of heat, passes to a beautiful yellow, the colour which it has at first, when separated by boiling water.

For making the acetate of mercury, the nitrate is prepared with a very gentle heat, and with excess of acid, that it may be retained in perfect solution, and that there may be no possibility of any admixture of sub-nitrate with the acetate formed. A larger proportion of acid is used by the Edinburgh college, than what was used by the London college; but, by accurate experiment, it was ascertained to be necessary for the success of the process. In mixing the solutions, we must be careful to pour the mercurial solution into that of the acetate of potass, because, by adopting the contrary procedure, the sub-nitrate of mercury will be precipitated undecomposed, if any peroxide be contained in the mercurial solution. For dissolving the acetate of potass, the London college only used as much water as was capable of retaining the nitrate of potass in solution; the acetate of mercury was therefore precipitated, and was purified by again dissolving it in boiling water, and crystallizing it. This part of the process is simplified by the Edinburgh and Dublin colleges, who use as much water for dissolving the acetate of potass as is capable of retaining, so long as it is hot, the acetate of mercury in solution, and of allowing it to crystallize as it cools. In this way, therefore, it is procured at once sufficiently pure. The exsiccation of the acetate of mercury is an operation of great delicacy; for it is so spongy, that it retains the moisture with great obstinacy; and it is decomposed so easily, that heat can scarcely be employed. It is best dried by compressing it between several folds of bibulous paper.

The Prussian Dispensatory directs acetate of mercury to be prepared by dissolving two ounces of the red oxide of mercury in about seven ounces of concentrated acetic acid, and evaporating the solution to dryness; but this process affords a salt of a very different nature from those prepared according to the directions of the British colleges, the latter containing protoxide, and being crystallizable; and the former the peroxide, and not crystallizable.

Acetate of mercury is scarcely soluble in cold water, but dissolves readily in boiling water. It generally crystallizes in micaceous plates, like boracic acid, and is extremely easy of decomposition.

It is supposed to be a mild preparation of mercury, and was the active ingredient of the celebrated Keyser's pills. In solution, it has also been recommended externally, to remove freckles and cutaneous eruptions.

MURIAS HYDRARGYRI, olim MERCURIUS SUBLIMATUS CORROSIVUS. *Ed.*

OXYMURIAS HYDRARGYRI. *Lond.*

Muriate of Quicksilver, formerly *Corrosive Sublimate, Oxy-muriate of Quicksilver.*

Take of

Purified quicksilver, two pounds;
Sulphuric acid, two pounds and a half;
Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid, in a glass vessel, (placed in a sand bath, *Ed.*), until the sulphate of quicksilver be dried, which is to be mixed, when cold, in a glass (earthen, *Lond.*) vessel, with the muriate of soda; then sublime in a glass cucurbit, with a heat gradually increased. (Lastly, separate the sublimed matter from the scoriæ. *Ed.*).

MURIAS HYDRARGYRI CORROSIVUM. *Dub.*
Corrosive Muriate of Quicksilver.

Take of
Purified quicksilver, two pounds;
Sulphuric acid, three pounds;
Dried muriate of soda, two pounds and a half.

Dissolve the quicksilver in the acid, and gradually increase the heat, until the mass become perfectly dry; when cold, triturate it in an earthen mortar, with the muriate of soda; then sublime in a proper vessel, with a heat gradually increased.

BY boiling the quicksilver to dryness with sulphuric acid, the metal is oxydized by the decomposition of part of the acid, and combines with the rest to form sub-sulphate of quicksilver. In the second part of the process, this sub-sulphate is decomposed by dried muriate of soda, muriate of quicksilver sublimes, and sulphate of soda remains behind. In Holland, it is manufactured by subjecting to sublimation a mixture of dried sulphate of iron, nitrate of potass, muriate of soda, and quicksilver. In the former editions of the Edinburgh Pharmacopœia, the mercury was oxydised by boiling to dryness in nitrous acid, and then sublimed with muriate of soda and sulphate of iron. Bergmann recommends the sublimation of sub-nitrate of mercury and muriate of soda; and Mr. Murray seems inclined to prefer it to the new process. It is prepared also directly, by dissolving red oxide of mercury in muriatic acid.

Muriate of quicksilver crystallizes, by sublimation, in prismatic needles, forming a white semi-transparent mass It is ponderous. Its taste is acrid, styptic, and durable. It is soluble in 20 parts of cold water, and in 2 at 212°. It is also soluble in 3.8 parts of alcohol, at 70°, and in almost an equal weight of boiling alcohol. It gives a green colour to syrup of violets. It is not altered by exposure to the air, and is sublimed unchanged by heat. It is not decomposed by any of the acids; but is soluble, without alteration, in the sulphuric, nitric, and muriatic acids. It is precipitated by all the alkalies and earths, of an orange-yellow colour, which gradually changes to a brick-red; and, by their carbonates, of a permanent yellow colour Ammonia forms with it an insoluble, white, triple salt. It is also decomposed by several of the metals. It consists, according to Mr. Chenevix (No. 1.), and to Mr. Zaboada (No. 2.), of

	N°. 1.	N°. 2.
Quicksilver,	69.7	71.5
Oxygen,	12.3	8.5

	N°. 1.	N°. 2.
Oxide of quicksilver,	82	80
Muriatic acid,	18	20
	100	100

		N°. 1.	N°. 2.
And the oxide thereof consists of,	Quicksilver,	85	90
	Oxygen,	15	10
		100	100

LIQUOR HYDRARGYRI OXYMURIATIS. *Lond.*

Solution of Oxymuriate of Quicksilver.

Take of
- Oxymuriate of quicksilver, eight grains;
- Distilled water, fifteen fluidounces;
- Rectified spirit, one fluidounce.

Dissolve the oxymuriate of silver in the water, and add to it the spirit.*

Muriate of mercury is one of the most violent poisons with which we are acquainted. Externally, it acts as an escharotic or a caustic; and in solution it is used for destroying fungous flesh, and for removing herpetic eruptions; but even externally it must be used with very great caution. It has, however, been recommended to be given internally by the respectable authorities of Boerhaave and Van Swieten; and it is the active ingredient of all the empirical antivenereal syrups. Were it really capable of curing the venereal disease, or equal in efficacy to the common modes of administering mercury, it would possess many advantages over them in other respects; but that it cannot be depended upon, is almost demonstrated by its use, as an antivenereal, being very much confined to the quacks, and by the testimony of the most experienced practitioners. Mr. Pearson says, that it will sometimes cure the primary symptoms of syphilis, especially if it produce considerable soreness of the gums, and the common effects of mercury; but that it will often fail in removing chancre, and where it has removed it, that the most steady perseverance will not secure the patient from a constitutional affection. It is, on some occasions, however, a useful auxiliary to a mercurial course, in quickly bringing the system under the influence of mercury, and in supporting its action after the use of frictions; and it is peculiarly efficacious in relieving venereal pains, in healing ulcers of the throat, and in promoting the desquamation of eruptions.

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* On this solution, which is introduced to facilitate the administration of this very active medicine, I have only to remark the dangerous mistake of Dr. Powell, who states the half ounce to contain only one eighth part of a grain, when, in fact, it contains half a grain.

SUBMURIAS HYDRARGYRI, olim CALOMELAS. *Ed.*
Sub-muriate of Quicksilver, formerly *Calomel.*

Take of
- Muriate of quicksilver, ground to powder in a glass mortar, four ounces;
- Purified quicksilver, three ounces.

Rub them together in a glass mortar, with a little water, to prevent the acrid powder from rising, until the mercury be extinguished; and having put the powder, after being dried, into an oblong phial, of which it fills only one third, sublime from warm sand. After the sublimation is finished, having broken the phial, throw away both the red matter found near the bottom of the phial, and the white matter near its neck, and sublime the rest of the mass. Grind this into a very minute powder, which is lastly to be washed with boiling distilled water.

SUBMURIAS HYDRARGYRI SUBLIMATUM, SIVE CALOMELAS. *Dub.*
Sublimed Submuriate of Quicksilver, or Calomel.

Take of
- Corrosive muriate of mercury, one pound;
- Purified quicksilver, nine ounces.

Rub them together until the globules disappear, and sublime with a sufficient degree of heat. Triturate the sublimed matter, and repeat the sublimation. Powder it, and wash with frequent affusions of distilled water, until the liquor poured off is not affected by some drops of water of carbonate of kali. Then dry.

HYDRARGYRI SUBMURIAS. *Lond.*
Submuriate of Quicksilver.

Take of
- Oxymuriate of quicksilver, one pound;
- Purified quicksilver, nine ounces.

Rub them together until the globules disappear, and sublime; then rub the whole matter again together, and sublime. Take out the sublimed matter, and powder and sublime it a second and a third time. Afterwards triturate the matter into a very subtile powder, to be prepared as directed for chalk.

WHEN quicksilver is triturated with muriate of quicksilver, it abstracts from the oxydized quicksilver of the muriate a part of its oxygen, and the whole mass assumes a blackish grey colour. When this is exposed to a degree of heat sufficient to convert it into vapour, the action of the different portions of quicksilver upon each other, and upon the muriatic acid, is much more complete; and the whole is converted into a solid white mass, consisting of mercury in a state of less oxydizement, and combined with less acid, than in the muriate.

The trituration of the muriate of mercury is a very noxious operation, as it is almost impossible to prevent the finer particles from rising and affecting the operator's eyes and nostrils. To lessen this evil, the Edinburgh college direct the addition of a little water. In the second part of the process, when the heat is applied, a small portion of quicksilver and undecomposed muriate first arise, and condense themselves in the highest part or neck of the phial; then the sub-muriate rises, and, being less volatile, condenses in the upper half of the body, while a small quantity of quicksilver, in a state of considerable oxydizement, remains fixed, or near the bottom. The Edinburgh college separates the sub-muriate from the other matters, and sublimes it again. The London and Dublin colleges triturate the whole together again, and re-sublime it twice. As in the first sublimation, a portion of the quicksilver and of the muriate of quicksilver always arise undecomposed, a second sublimation is necessary, especially if we triturate the whole products of the first sublimation together; but any further repetition of the process is perfectly useless. Lest any portion of muriate should have escaped decomposition, the sub-muriate must be edulcorated with boiling distilled water, until the water which comes off forms no precipitate with alkalies.

Sub-muriate of mercury is generally obtained in the form of a white solid mass; but is capable of crystallizing in tetrahedral prisms terminated by pyramids. It has no taste, and is scarcely soluble in water or in alcohol. It is less volatile than muriate of mercury. It is blackened by light, and becomes brown when triturated with lime-water or the alkalies. It is converted by oxymuriatic acid into muriate of quicksilver. According to Mr. Chenevix (N°. 1), and to M. Zaboada (N°. 2.), it consists of

	N°. 1.	N°. 2.		N°. 1.	N°. 2.
Quicksilver,	79	85	Oxide of quicksilver,	88.5	89.4
Oxygen,	9.5	4.4			
			Muriatic acid,	11.5	10.6
				100	100

		N°. 1.	N°. 2.
And its oxide contains,	Quicksilver,	89.3	95.
	Oxygen,	10.7	5.
		100	100

According to Mr. Chenevix's analysis, therefore, 54 parts of quicksilver seem sufficient to convert 100 of the muriate into sub-muriate; but, according to Zaboada's, 75 are necessary, which is exactly the proportion directed by the colleges.

Medical use.—The sub-muriate of quicksilver is one of the best mercurials we possess. By proper management it may be made to increase, in a remarkable manner, almost any of the secretions or excretions. One grain mixed with sugar, and snuffed up the nostrils, is recommended as a powerful errhine in amaurosis. The same mixture is blown into the eye, to remove specks from the cornea. Given in doses of one grain morning and evening, or in larger doses combined with opium, to prevent it from acting as a purgative, it excites ptyalism. In larger doses of five grains and upwards, it is an excellent purgative. Combined with diuretics, it proves diuretic, and with sudorifics, sudorific.

It is one of the preparations of mercury which is capable of curing syphilis in every form. It also produces very powerful and salutary effects in obstructions and chronic inflammations of the viscera, especially of the liver; and, in general, it is applicable to every case in which mercurials are indicated.

SUB-MURIAS HYDRAGYRI PRÆCIPITATUS. *Ed.*

Precipitated Sub-muriate of Quicksilver.

Take of
  Diluted nitrous acid,
  Purified quicksilver, each eight ounces;
  Muriate of soda, four ounces and a half;
  Boiling water, eight pounds.

Mix the quicksilver with the diluted nitrous acid, and, towards the end of the effervescence, digest with a gentle heat, frequently shaking the vessel in the meantime. But it is necessary to have added more quicksilver to the acid than it is capable of dissolving, that a perfectly saturated solution may be obtained.

Dissolve at the same time the muriate of soda in the boiling water, and into this solution pour the other while still hot, and mix them quickly by agitation; pour off the saline liquor after the precipitate has subsided, and wash the sub-muriate of quicksilver by repeated affusions of boiling water, which is to be poured off each time after the deposition of the sub-muriate, until the water come off tasteless.

SUB-MURIAS HYDRARGYRI PRÆCIPITATUM. *Dub.*

Precipitated Sub-muriate of Quicksilver.

Take of
  Purified quicksilver, seven ounces, by weight;
  Diluted nitrous acid, five ounces, by measure.

Pour the acid upon the quicksilver in a glass vessel; and when the mixture has ceased to effervesce, digest in a moderate heat, with occasional agitation, for six hours. Then increase the heat, until the liquor boil a little, which is to be poured off

from the quicksilver which remains, and quickly mixed with a boiling solution already prepared, of
Muriate of soda, four ounces;
Water, ten pounds.

Wash the powder which subsides with warm distilled water, as long as the liquor decanted from it is precipitated by some drops of the liquor of water of carbonate of kali; then dry it.

In the first part of this process, a solution of nitrate of quicksilver, with excess of oxide, is formed. In the second, there is a mutual decomposition of this nitrate, and of the muriate of soda; nitrate of soda is formed, and muriate of quicksilver, with excess of oxide. In this preparation, our object is to obtain the insoluble compound which results from the combination of the protoxide of mercury with muriatic acid. In this view, the application of heat, in dissolving the mercury in the nitrous acid, is improper; for a portion at least of the mercury is converted into its peroxide, which occasions, in the first place, the formation of a little sub-nitrate of mercury, when poured into the saline solution; and, secondly, the formation of a proportion of muriate of mercury (corrosive sublimate), which must be washed away. Accordingly, Mr. Murray has found that of more mild, and less of corrosive muriate of mercury are formed, when the solution is made slowly and in the cold, than when the directions of the colleges are complied with.

When properly prepared, the sub-muriate obtained by precipitation scarcely differs from that obtained by sublimation. Gottling found no other difference than that the precipitated sub-muriate became grey, when triturated with lime-water, whereas the sublimed sub-muriate becomes black. But he exposed to heat half an ounce of the precipitated sub-muriate in a subliming apparatus; scarcely a grain of a reddish matter remained fixed; and the sublimed matter now became black when triturated with lime-water, and differed in no respect from sub-muriate prepared in the ordinary way by sublimation. It, therefore, would seem to be an improvement in the process, to sublime the sub-muriate after it is precipitated; especially as by that operation it would be most effectually separated from any sub-nitrate which might be mixed with it.

There is still another way of preparing the sub-muriate of mercury, which must be noticed. It was contrived by Hermbstaedt, and is recommended by Moench, with the confidence derived from experience, as the very best process for preparing the sub-muriate of quicksilver.

Take of
Pure quicksilver, seven ounces and a half;

Sulphuric acid, four ounces;
Dried muriate of soda, five ounces and a half.

Distil in a glass retort the sulphuric acid, with four ounces of the quicksilver, until they be converted into a dry white mass. Triturate the sulphate of mercury, thus formed, with the remaining three ounces and a half of quicksilver, until the globules disappear; then add the muriate of soda; mix them, and sublime. As the product of the first sublimation still contains unoxydized quicksilver, it is to be again triturated and sublimed. The sublimate being washed, is now pure sub-muriate of quicksilver, and weighs about six ounces.

THE theory of this process is the same with that of the formation of the muriate of quicksilver. The difference between the two products arises from the proportion of quicksilver being greater, and that of the muriate of soda employed being less. We are not prepared to state the comparative economy of these three processes, described, for preparing sub-muriate of quicksilver; but of the last process, we may observe, that according to Mr. Chenevix's analysis, seven ounces and a half of quicksilver should furnish nine ounces and a half of sub-muriate of quicksilver; and, according to M. Zaboada's, nearly nine: so that there is evidently a considerable loss, which must be owing either to the formation of muriate of quicksilver, or of oxide of quicksilver.

SUB-MURIAS HYDRARGYRI AMMONIATUM. *Dub.*
Ammoniated Sub-muriate of Quicksilver.

Add to the liquor decanted from the precipitated sub-muriate of quicksilver, as much water of caustic ammonia as is sufficient to precipitate the whole metallic salt. Wash the precipitate with cold distilled water, and dry it on blotting paper.

HYDRARGYRUS PRÆCIPITATUS ALBUS. *Lond.*
White Precipitated Quicksilver.

Take of
Oxy-muriate of quicksilver,
Muriate of ammonia, of each, half a pound;
Solution of sub-carbonate of potass, half a pint;
Distilled water, four pints.

Dissolve first the muriate of ammonia, afterwards the oxy-muriate of quicksilver, in the distilled water, and add to these the solution of sub-carbonate of potass. Wash the precipitate until it become insipid and dry.

Muriate of quicksilver is about thirty times more soluble in a solution of muriate of ammonia than in pure water; and, during the solution, there takes place a considerable increase of temperature. Now, as these facts sufficiently prove a reciprocal action of the two salts, and as there is no decomposition, it is evident that they must have combined to form a triple salt; especially as they cannot be again separated either by sublimation or crystallization. This compound may therefore, with propriety, be termed Muriate of Mercury and Ammonia. It is the Sal Alembroth of the alchemists. It is very soluble in water, and is sublimed by heat without decomposition. When to a solution of this salt we add a solution of an alkaline carbonate, either of potass, as directed by the London college, or of soda, as by that of Berlin, there occurs a partial decomposition. The alkali combines with a portion of the muriatic acid, and reduces the muriate of mercury and ammonia to the state of a sub-muriate, which, being insoluble, falls to the bottom of the solution.

The process of the Dublin college is new and well contrived, as it converts to use the washings of the precipitated sub-muriate, and thus partly obviates the objection of want of economy in the directions given by the college for preparing it. By the simple addition of ammonia, the whole muriate of mercury contained in the washings is precipitated, in the form of sub-muriate of mercury and ammonia.

The sub-muriate of mercury and ammonia, thus precipitated, has at first an earthy, and afterwards a metallic taste. It is not soluble in water. It is decomposed by heat, furnishing water, ammonia, and nitrogen gas, while 0.86 of sub-muriate of mercury remains behind. Sulphuric and nitric acids partially decompose it, and convert it into muriate of mercury, and triple salts of mercury and ammonia. Muriatic acid dissolves it, and converts it into muriate of quicksilver and ammonia. According to Fourcroy's analysis, it consists of

81 oxide of mercury,
16 muriatic acid,
3 ammonia.

100

It is only used for ointments; and its principal recommendation is its fine white colour.

OXIDUM HYDRARGYRI CINEREUM. *Ed.*

Ash-coloured Oxide of Quicksilver.

Take of
Purified quicksilver, four parts;

Diluted nitrous acid, five parts;
Distilled water, fifteen parts;
Water of carbonate of ammonia, a sufficient quantity.

Dissolve the mercury in the nitrous acid; then gradually add the distilled water, and pour into the mixture as much water of the carbonate of ammonia as shall be sufficient to precipitate the whole of the oxide of mercury, which is then to be washed with pure water, and dried.

Lond.

Take of
Sub-muriate of quicksilver, an ounce;
Lime-water, a gallon.

Boil the sub-muriate of quicksilver in the lime-water, with constant stirring, until the grey oxide subside; wash this with distilled water, and then dry.

PULVIS HYDRARGYRI CINEREUS. *Dub.*
Ash-coloured Powder of Quicksilver.

Take of
Quicksilver, two ounces, by weight;
Diluted nitrous acid, two ounces, by measure.

Dissolve the quicksilver with a low heat, and dilute the liquor with eight ounces, by measure, of cold distilled water; then drop into it an ounce and a half, by measure, of the water of carbonate of ammonia, or as much as may be sufficient to precipitate the metal, which is to be washed with warm distilled water, until the decanted liquor is not precipitated by some drops of water of sulphuret of ammonia; and afterwards dry it.

THESE processes, which are essentially the same, are intended to furnish a substitute for the black oxide of quicksilver, on which the efficacy of the mercurials most frequently employed, and most certainly useful, depends. In these, the mercury is oxydized by trituration, in contact with the atmosphere; but the operation is both so tedious and troublesome, that it is often imperfectly performed, or assisted by improper means.

In the processes we are now explaining, it was supposed, that, as ammonia has a stronger affinity for nitric acid than oxide of mercury has, it would separate oxide of mercury from its solution in nitric acid; and, therefore, that the precipitate obtained was oxide of mercury, similar to that formed by trituration. But, since the nature of the triple metallic salts has been better understood, this has been discovered to be an error. The grey precipitate which is formed may, generally speaking, be called a sub-nitrate of mercury and ammonia; for it consists of oxide of mercury and ammonia, not saturated with nitric acid; but, even to ocular inspection, it does not seem to be homogeneous; and, when it is digested in acetic acid, it is partially dissolved, and the residuum acquires a very pale, or almost white, colour. The portion dissolved seems to be black oxide, and the white residuum to be pure sub-nitrate of mercury and ammonia, which, according to Fourcroy, crystallizes in brilliant polyhedral crystals, without smell, of an extremely styptic taste, scarcely soluble in water; is decomposed by heat, by the sulphuric and muriatic acids, and by lime, potass, and soda; and consists of 68.20 oxide of mercury, 16 of ammonia, and 15.80 of nitric acid. According to these observations, this preparation ought not to be called the grey oxide of mercury, and is not identical with the black oxide of mercury, prepared by trituration. If, however, it answered the same purposes, the identity would be of little consequence; but, from its never having been introduced into general use, although so much more easily prepared, we may presume, that it is not equal in point of efficacy.

Black oxide of mercury may, however, be obtained, according to the direction of Saunders, now adopted by the London college, by triturating with lime-water, and subsequent edulcoration, the sublimed sub-muriate of mercury, or rather the precipitated sub-muriate, as proposed by Gottling; and that the decomposition may be more easy and complete, I may suggest, that for this preparation the latter sub-muriate should not be dried, but should be triturated with the lime-water as soon as it is edulcorated. This simple black oxide certainly merits a fair trial.

This oxide is said, however, by M. Braamcamp and Siquiera-Oliva, to be prepared in the greatest purity, by boiling the ash-coloured oxide of the Edinburgh college, long and violently in water, until the triple salt be dissolved or decomposed. In this state, it consists of mercury 92.5, and oxygen 7.5.

The Prussian college direct a black oxide of mercury to be prepared, by mixing four ounces of mercury with six ounces of nitrous acid, diluted with two ounces of distilled water, and occasionally agitating them, without heat, until the acid be saturated. The solution is then to be diluted with distilled water, and water of caustic ammonia to be dropped into it, as long as the precipitate formed is black.

HYDRARGYRUM CUM MAGNESIA. *Dub.*
Quicksilver with Magnesia.

Take of
Quicksilver,
Manna, each one ounce;
Magnesia, half an ounce.

Triturate the quicksilver with the manna, in an earthen-ware mortar, adding some drops of water, to give the mixture the consistence of a syrup, until the metallic globules become no longer visible. Then add, with constant trituration, a drachm of the magnesia. After they are thoroughly mixed, add a pint of warm water, and shake the mixture: then let the liquor rest, and decant from the sediment as soon as it subsides. Repeat this washing twice, that the manna may be totally washed away, and, with the sediment still moist, mix the remainder of the magnesia. Lastly, dry the powder on blotting paper.

HYDRARGYRUM CUM CRETA. *Dub.*
Quicksilver with Chalk.

Is to be prepared in the same manner, only employing precipitated chalk instead of the magnesia.

HYDRARGYRUS CUM CRETA. *Lond.*
Quicksilver with Chalk.

Take of
Purified quicksilver, three ounces;
Prepared chalk, five ounces.
Triturate them together until the globules disappear.

QUICKSILVER has a strong affinity for oxygen, and absorbs it slowly from the atmosphere. But the combination may be considerably accelerated by agitation, and still more by triturating quicksilver with any substance which promotes its mechanical division, and thus increases its surface. With this view, quicksilver is triturated with viscid substances, as fats, honey, syrup, &c. or with pulverulent substances, as the chalk in the process of the London college.

In this state of oxydizement, quicksilver contains about 0.4 of oxygen, according to Fourcroy, and about 0.75, according the Portuguese chemists; is soluble in acids, without the extrication of nitrous gas, and is easily reduced by heat, and even by light.

The black oxide is the mildest, but, at the same time, the most efficacious, of the preparations of mercury. Combined with magnesia or chalk, it is not in general use; but in the form of the common mercurial pill and ointment, it is more employed than any other preparation of the same metal, except calomel.

OXYDUM HYDRARGYRI. *Dub.* HYDRARGYRI OXYDUM RUBRUM. *Lond.*

Oxyde of Quicksilver. Red Oxyde of Quicksilver.

Take of

Purified quicksilver, any quantity (one pound, *Lond.*)

Put it into an open glass vessel, with a narrow mouth and wide bottom. Expose this (open, *Lond.*) to about the six-hundredth degree of heat, until the metal be converted into red scales (then reduce it to a very fine powder. *Lond.*)

THIS is an extremely tedious, and therefore expensive, operation, because mercury is incapable of absorbing from the atmosphere the quantity of oxygen necessary to convert it into the red oxide, except when in the state of vapour. But as the form of a vessel which will prevent the dissipation, and loss of the mercurial vapour, will, at the same time, hinder the free access and frequent renewal of the air, the operation can only proceed slowly. The vessel most advantageously employed is a wide flat-bottomed matrass, with a very narrow, and almost capillary neck. Only so much mercury is introduced into it as will cover the bottom of the matrass; and the vessel is not inserted in the sand deeper than the mercury stands within it. A degree of heat is then applied, sufficient to cause a gentle ebullition in the mercury, which is thus alternately converted into vapour, and condensed again in the upper part of the vessel. While in the state of vapour, it absorbs the oxygen of the air contained in the vessel, by which means it is gradually changed into a black, and then into a red powder; but a complete conversion into the latter state is not affected in less than several months.

Red oxide of quicksilver, thus prepared, consists of small crystalline grains, of a deep red colour, and very brilliant sparkling appearance. By heat, it may be sublimed in the form of a beautiful ruby-coloured vitrified substance. At a red heat it is decomposed, giving out oxygen gas, while the metal is revived, and is immediately volatilized. It is soluble in several of the acids; and, during its solution, it does not decompose them or water. It is easily disoxydized. It contains, according to Fourcroy, 92 of mercury, and 8 of oxygen; but, according to Chenevix, 85 of the former, and 15 of the latter.

Medical use.—It is not only an acrid substance, violently purgative and emetic, but even caustic and poisonous. Its internal use is proscribed; but it is applied externally as an escharotic, being previously triturated to a very fine powder; or it is formed into a stimulating ointment with unctuous substances.

OXIDUM HYDRARGYRI RUBRUM PER ACIDUM NITRICUM, olim MERCURIUS PRÆCIPITATUS RUBER. *Ed.*

Red Oxide of Quicksilver by Nitric Acid, formerly *Red Precipitated Mercury.*

Take of
  Purified quicksilver, one pound;
  Diluted nitrous acid, sixteen ounces.

Dissolve the quicksilver, and evaporate the solution, with a gentle heat, to a dry white mass; which, after being ground into powder, is to be put into a glass cucurbit, and to have a thick glass plate laid upon the surface. Then, having adapted a capital, and placed the vessel in a sand-bath, apply a gradually increased heat, until the matter be converted into very red scales.

HYDRARGYRI NITRICO-OXYDUM. *Lond.*

Nitric Oxide of Quicksilver.

Take of
  Purified quicksilver, three pounds;
  Nitrous acid, one pound and a half;
  Distilled water, two pints.

Mix in a glass vessel, and boil until the quicksilver be dissolved, and after the evaporation of the water, a white mass remains. Rub this to powder, and put it into another vessel very shallow; then apply a very gentle heat, and gradually increase it, until it cease to emit red vapours.

OXYDUM HYDRARGYRI NITRICUM. *Dub.*

Nitric Oxide of Quicksilver.

Take of
  Purified quicksilver, ten ounces, by weight;
  Diluted nitrous acid, ten ounces, by measure.

Mix them in a glass vessel, and dissolve the quicksilver, with a heat gradually increased; then augment the fire until the matter remaining in the bottom of the vessel be converted into red scales.

IN the first part of these processes, a fully saturated nitrate of mercury is formed. In the second part, the metal is oxydized to the maximum by the decomposition of the acid. When a sufficient heat is applied, the nitrate of mercury first melts, then exhales nitrous oxide gas, and changes its colour successively to yellow, orange, and brilliant purple red. If well prepared, it should have a crystalline scaly appearance, sublime entirely at a red heat, and be soluble, without any residuum, in nitrous acid. According to Fourcroy, it contains no nitrous acid, unless a sufficient heat has not been applied; but, according to most other chemists, it contains some nitrous acid; and differs from the red oxide prepared by the action of heat alone, in always being more acrid.

This is an extremely difficult operation, and skilful operators not unfrequently fail to obtain it of that brilliant crystalline appearance which is esteemed. M. Paysse, who paid great attention to this preparation in Holland, where it is manufactured in large quantities, gives the following directions:—Dissolve 100 pounds of pure mercury in 140 of pure nitrous acid, of sp. grav. 1.3 to 1.37, promoting their action by a sand-bath; evaporate by distillation, and, when the formation of nitrous gas indicates the decomposition of the nitrate of mercury, remove the receiver, and apply a steady and moderate heat for about eight hours, until a match, which has been just blown out, inflames, on being introduced into the matrass, which is a proof that the operation is finished. To its success it is necessary, 1. That the nitrous acid be not mixed with muriatic; 2. That it be sufficiently strong; 3. That the evaporation be conducted with a moderate heat 4. That the vessel be sufficiently large and flat, so that a large surface be exposed, and the whole equally heated; 5. That the heat be gradually augmented; and, lastly, That it be steadily maintained the whole time. Turf is the fittest fuel.

Medical use.—It is only used as an escharotic, and care must be taken that it is finely levigated, otherwise it only irritates, without destroying the parts to which it is applied. It is a very common application in chancres.

SUB-SULPHAS HYDRARGYRI FLAVUS, olim TURPETHUM MINERALE. *Ed.*

Yellow Sub-sulphate of Quicksilver, formerly *Turpeth Mineral.*

Take of
Purified quicksilver, four ounces;
Sulphuric acid, six ounces.

Put them into a glass cucurbit, and boil them in a sand-bath to dryness. Throw into boiling water the white matter which is left in the bottom, after having reduced it to powder. A yellow powder will immediately be produced, which must be frequently washed with warm water.

OXYDUM HYDRARGYRI SULPHURICUM. *Dub.*

Sulphuric Oxyde of Quicksilver.

Take of
Purified quicksilver, one pound;
Sulphuric acid, a pound and a half.

Dissolve in a glass vessel, with sufficient heat, which is to be gradually increased until the matter be entirely dried. This, upon pouring on a very large quantity of warm water, will immediately become yellow, and fall into powder, which is to be well triturated with this water, in a glass mortar.

After pouring off the supernatant liquor, wash the powder with distilled water, as often as the decanted liquor forms a precipitate, on the addition of some drops of the water of sub-carbonate of kali; and, lastly, dry it.

THE action of sulphuric acid on mercury has been examined with considerable attention by Fourcroy. In the cold, they have no action on each other; but on the application of heat, the sulphuric acid begins to be decomposed, sulphureous acid gas is extricated, and the metal is oxidized, and combines with the undecomposed acid, forming with it a white saline mass, covered with a colourless fluid. In this state it reddens vegetable blues, is acrid and corrosive, does not become yellow by the contact of the air, and is not decomposed by water either warm or cold. It is therefore super-sulphate of quicksilver, and the proportion of the acid in excess is variable.

By washing the saline mass repeatedly with small quantities of water, it is at last rendered perfectly neutral. It no longer reddens vegetable blues. It is white; it crystallizes in plates, or fine prismatic needles; it is not very acrid; it is not decomposed either by cold or boiling water, but is soluble in 500 parts of the former, and in about 250 of the latter. It is much more soluble in water, acidulated with sulphuric acid. The sulphate of quicksilver consists of

	Fourcroy.	Braamcamp and Siguеira.
Quicksilver	75.	57.42
Oxygen	8.	6.38
Sulphuric acid	12.	31.8
Water	5.	4.4
	100.	100.

But if, instead of removing the excess of acid from the super-sulphate of quicksilver, by washing it with water, we continue the action of the heat according to the directions of the colleges, there is a copious evolution of sulphureous acid gas, and the saline residuum is converted into a white mass, which therefore evidently contains both a larger proportion of mercury, and in a state of greater oxidizement, than the salt from which it was formed. According to Braamcamp and Sigueira, it consists of 31.8 acid; 63.8 peroxide, and 4.4 water. But this white saline mass is farther analysed by the affusion of hot water; for one portion of it is dissolved, while the remainder assumes the form of a beautiful yellow powder. The portion dissolved is said to contain excess of acid. The yellow powder is, on the contrary, a sub-sulphate.

The sub-sulphate of quicksilver has a bright yellow colour, a considerably acrid taste, is soluble in 2000 parts of cold water, is also soluble in sulphuric acid, slightly diluted, is decomposed by the nitric acid, and forms muriate of quicksilver with the muriatic acid, while the neutral sulphate forms sub-muriate. It oxidizes quicksilver, and is converted by trituration with it into a black powder. At a red heat it gives out oxygen gas, and the metal is revived. It consists of

	Fourcroy.	Braamcamp and Sigueira.
Quicksilver	76.	73.23
Oxygen	11.	8.47
Sulphuric acid	10.	15.
Water	3.	.3
	100.	100.

Medical use.—It is a strong emetic, and with this intention operates the most powerfully of all the mercurials that can be safely given internally. Its action, however, is not confined to the primæ viæ; it will sometimes excite a salivation, if a purgative be not taken soon after it. It is used in virulent gonorrhœas and other venereal cases, where there is a great flux of humours to the parts. But its chief use, at present, is in swellings of the testicles from a venereal affection; and it seems not only to act as a mercurial, but also, by the severe vomiting it occasions, to perform the office of a discutient, by accelerating the motion of the blood in the parts affected. It is said likewise to have been employed with success, in robust constitutions, against leprous disorders, and obstinate glandular obstructions: the dose is from two grains to six or eight. It may be given in doses of a grain or two as an alterative and diaphoretic. Dr. Hope, senior, found, that in doses of one grain, with a little powder of liquorice root, it forms a very convenient errhine.

This medicine was lately recommended as the most effectual preservative against the hydrophobia.

On the whole, however, we consider it as a superfluous preparation, whose place may be more safely supplied by other mercurials or emetics.

SULPHURETUM HYDRARGYRI NIGRUM, *Ed. Dub.*

Black Sulphuret of Quicksilver, formerly *Æthiops Mineral.*

Take of
Purified quicksilver,
Sublimed sulphur, each equal weights.

Grind them together in a glass mortar (an earthen mortar, *Dub.*) with a glass pestle, till the mercurial globules totally disappear.

(It is also prepared with twice the quantity of quicksilver. *Ed.*)

THIS process, simple as it appears, is not, even in the present advanced state of chemistry, perfectly understood. It was formerly imagined, that the quicksilver was merely mechanically divided, and intimately mixed with the sulphur. But that they are really chemically united is indisputably proved by the insolubility of the compound in nitrous acid. Fourcroy is of opinion, that during the trituration, the mercury absorbs oxygen, and is converted into the black oxide, and that in this state it is slightly combined with the sulphur. The editors of Gren also suppose it to be in the state of black oxide, but that it is combined with hydroguretted sulphur; and they direct a little water to be added during the trituration, that by its decomposition it may facilitate the process.

The black sulphuret of quicksilver, thus prepared by trituration, has a pulverulent form, is insoluble in nitric acid, is totally soluble in a solution of potass, and is precipitated unchanged from this solution by acids. It is not altered by exposure to the air; and when heated in an open vessel, it emits sulphureous acid gas, acquires a dark violet colour, and, lastly, sublimes in a brilliant red mass, composed of crystalline needles.

The combination of quicksilver with sulphur may be much more speedily affected by the assistance of heat, by pouring the mercury, previously heated, upon the sulphur in a state of fusion, and stirring them until they cool, and form a consistent mass, which may be afterwards powdered. The sulphuret prepared by fusion differs, however, from that prepared by trituration; for it is not soluble in a solution of potass, but is converted by long ebullition in it into the red sulphuret, and it also reddens spontaneously, in course of time, from the action of the air.

Black sulphuret of mercury may be also prepared in the humid way, as it is called, by precipitation, or even by direct solution. According to Berthollet, mercury agitated with sulphuretted hydroguret of ammonia, forms a black sulphuret exactly resembling that prepared by trituration; but if hydroguretted sulphuret of ammonia be used, the black precipitate formed gradually assumes a red colour, and the solution contains sulphuretted hydroguret of ammonia. The same phenomena take place with all the mercurial salts.

As a medicine, black sulphuret of quicksilver possesses no very evident effects. It is principally used as an alterative in glandular affections, and in cutaneous diseases. It has been commonly given in doses of from 5 to 10 grains; but even in doses of several drachms, and continued for a considerable length of time, it has scarcely produced any sensible effect.

SULPHURETUM HYDRAGYRI RUBRUM. *Dub. Lond.*

Red Sulphuret of Quicksilvor.

Take of
Quicksilver, purified, forty ounces;
Sublimed sulphur, eight ounces.

(Mix the quicksilver with the melted sulphur; and if the mixture take fire, extinguish it by covering the vessel; afterwards reduce the mass to powder, and sublime it. *Dub.*)

(Mix the quicksilver with the melted sulphur; and as soon as the mass swells up, remove the vessel from the fire, and cover it strongly, to prevent it from catching fire; then powder it and sublime. *Lond.*)

As soon as the mercury and sulphur begin to unite, a considerable explosion frequently happens, and the mixture is very apt to take fire, especially if the process be somewhat hastily conducted. This accident the operator will have previous notice of, from the matter swelling up, and growing suddenly consistent; as soon as this happens, the vessel must be immediately close covered.

During the sublimation, care must be had that the matter do not rise into the neck of the vessel, so as to block it up and cause it to burst. To prevent this, a wide-necked bolt-head, or rather an oval earthen jar, coated, should be chosen for the subliming vessel. If the former be employed, it will be convenient to introduce at times an iron wire, somewhat heated, in order to be the better assured that the passage is not blocking up; the danger of which may be prevented by cautiously raising the vessel higher from the fire.

If the ingredients be pure, there is no residuum. In such cases, the sublimation may be known to be over, by introducing a wire as before, and feeling with it the bottom of the vessel, which will then be perfectly smooth: if any roughness or inequalities be perceived, either the mixture was impure, or the sublimation is not completed; if the latter be the case, the wire will soon be covered over with the rising cinnabar.

M. Tuckert and Paysse have described, from actual observation, the process followed in the manufactory of M. Brand at Amsterdam, where 48,000 pounds of cinnabar are annually prepared. 150 pounds of sulphur are mixed with 1080 pounds of mercury, and exposed to a moderate heat in a bright iron kettle, one foot deep, and two and a half in diameter. The black sulphuret of mercury, thus produced, is reduced to powder, and put up in earthen pots capable of containing about a quart of water. The subliming apparatus consists of three large coated crucibles, bound with iron, and surmounted with domes of iron, through the top of which the black sulphuret is introduced. These are built into a furnace, in such a manner that two thirds of each apparatus is exposed to the action of the flame, which circulates freely around them. The fuel made use of is turf, which is found preferable to all others, probably from its affording a steady and moderate heat. The fire is kindled in the evening; and when the crucibles have become red, the pots containing the black sulphuret are emptied into them successively, at first one into each, and afterwards two, three, or more at a time, according to the violence of the inflammation which succeeds. Sometimes the flame rises four, or even six feet above the domes; when its violence is a little abated, the aperture is covered closely up with a lid of iron. In this manner the whole quantity is introduced into the three crucibles in about thirty-four hours. The fire is steadily supported in a proper degree for thirty-six hours, and the sublimation assisted by stirring the matter every quarter of an hour with a triangle of iron, until the whole is sublimed, when the fire is allowed to expire. The colour of the flame changes during the process from a dazzling white to a yellow white, orange yellow, blue and yellow, green, violet, and blue and green. When it acquires a fine skye-blue, or indigo colour, and rises only an inch or two above the aperture, the aperture is closed hermetically, and luted with clay and sand. After the apparatus has cooled, 400 pounds of sublimed red sulphuret of mercury are found in each, so that there is a loss of 30 pounds on the 1230 of materials employed. The process by which cinnabar is converted into vermilion is kept a secret by the Dutch; but M. Paysse discovered, that by keeping some levigated cinnabar in the dark, covered with water, and stirred frequently for a month, it acquires the brilliant colour of Chinese vermilion.

When taken out of the subliming vessels, the red sulphuret of quicksilver is a brilliant crystalline mass, and first acquires its very rich colour when reduced to the form of a fine powder by trituration. It has neither smell nor taste, and is insoluble in water and in alcohol. In close vessels it sublimes entirely unchanged, but requires for this purpose a pretty great degree of heat. It is not soluble in any acid, and is only decomposed by the nitro-muriatic, which dissolves the quicksilver, and separates the sulphur. It is not decomposed by boiling it with solutions of the alkalies, but is decomposed by melting it with potass, soda, lime, iron, lead, copper, antimony, and several other metals. Proust has proved that it consists of 85 quicksilver, and 14 or 14½ sulphur, and that the quicksilver is not oxidized to a maximum, as had been falsely supposed, but is in its metallic state. His analysis is confirmed by the other methods by which cinnabar may be prepared. Thus, the black sulphuret of quicksilver, by fusion, is converted into the red sulphuret, by boiling it in a solution of potass, which can only act by dissolving the sulphuretted hydrogen and superfluous sulphur. Sub-muriate, or sub-sulphate of mercury, sublimed with sulphur, furnish red sulphuret of mercury, and muriate, or sulphate of mercury.

Medical use.—Red sulphuret of quicksilver is sometimes used in fumigations against venereal ulcers in the nose, mouth, and throat. By inhaling the fumes produced by throwing half a drachm of it on red hot iron, a violent salivation has been produced. This effect is by no means owing to the medicine as a sulphuret; for, when set on fire, it is no longer such, but mercury resolved into vapour, and blended with the sulphureous acid gas; in which circumstances, this mineral has very powerful effects.

Mr. Pearson, from his experiments on mercurial fumigation, concludes, that where checking the progress of the disease suddenly is an object of great moment, and where the body is covered with ulcers, or large and numerous eruptions, and, in general, to ulcers, fungi, and excrescenses, the vapour of mercury is an application of great efficacy and utility; but that it is apt to induce a ptyalism rapidly, and great consequent debility; and that, for the purpose of securing the constitution against a relapse, as great a quantity of mercury must be introduced into the system, by inunction, as if no fumigation had been employed.

CHAP. XI.—LEAD.

ACETAS PLUMBI. *Dub.*
Acetate of Lead.

Take of
  Sub-acetate of lead, called ceruse, any quantity;
  Distilled vinegar, ten times its weight.

Digest in a glass vessel, until the vinegar become sweet. Having poured this off, add more vinegar, until it cease to become sweet. Filter the liquor, and crystallize by alternate slow evaporation and crystallization. The crystals are to be dried in the shade.

ACETIS PLUMBI, olim SACCHARUM SATURNI. *Ed.*
Acetate of Lead, formerly *Sugar of Lead.*

Take of
  White oxide of lead, any quantity;

Put it into a cucurbit, and pour upon it, of
Distilled acetous acid, ten times its weight.

Let the mixiure stand upon warm sand till the acid becomes sweet, which is then to be poured off, and fresh acid added until it cease to become sweet; then evaporate all the liquor, freed from impurities, in a glass vessel, to the consistence of thin honey, and set it aside in a cold place, that crystals may be formed, which are to be dried in the shade. The remaining liquor is again to be evaporated, that new crystals may be formed; and the evaporation is to be repeated until no more crystals concrete.

SUPERACETAS PLUMBI. *Lond.*
Superacetate of Lead.

Take of
Carbonate of lead, one pound;
Acetic acid, one gallon.

Boil the carbonate of lead with the acid, until this be saturated; then filter through paper, and, after proper evaporation, till a pellicle be formed, set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

THE acetate of lead is seldom prepared by the apothecary, as he can procure it at an infinitely cheaper rate from those who manufacture it in large quantities. The preparation of it, as directed by the colleges, is a case of simple solution. The process frequently fails, from the oxide of lead employed being adulterated with carbonate of lime, or some other earthy substance. The acetic acid employed should be as strong as can be procured; for with a weak acid the product of pure salt is small, and the quantity of mother-water is increased. The addition of a small quantity of alcohol to the solution, after it has been duly evaporated, is said to improve the beauty of the crystals. The mother-water (which probably is essentially the same with Goulard's extract of lead), may also be made to furnish pure crystals, by adding to it a fresh portion of acetic acid; for, without that precaution, it furnishes only a very heavy, yellow, pulverulent mass, in which there seems to be an excess of oxide of lead, whereas the crystallized salt is, in fact, a super-acetate of lead.

The manufacture of acetate of lead is conducted more economically when the oxide is dissolved in the acid at the same time that it is prepared, which is done by alternately exposing plates of lead to the vapour of acetic acid, and immersing the plates, thus covered with oxide, into the acid itself.

Acetate of lead has a sweet styptic taste. It has a white colour, and crystallizes in flat parallelopipeds, terminated by a wedge, or more commonly in shining needles. It is soluble in water and in alcohol; effloresces slightly in the air, and is decomposed by heat and light. It reddens vegetable blues, and is decomposed by the alkalies, and most of the earths and acids. It consists of

Acid -	26
Yellow oxide	58
Water -	16
	100

Medical use.—The internal use of acetate of lead, notwithstanding the encomiums some have been rash enough to bestow upon it, is entirely to be rejected. It forms, however, a very valuable external application in superficial and phlegmonic inflammations, bruises, and diseases of the skin. It is always applied in solution, either simply, or by means of cloths soaked in it, or mixed with bread-crumb. A drachm, with five ounces of any distilled water, forms a strong solution, and with ten ounces of water, a weak solution. If common water be used, the addition of about a drachm of acetous acid will be necessary to keep the lead in solution.

LIQUOR SUB-ACETATIS LYTHARGYRI. *Dub.*
Liquor of Sub-acetate of Litharge.

Take of
Litharge, one pound;
Distilled vinegar, eight pints.
Boil to six pints in a glass vessel, with continual agitation; pour off the liquor after the fæces have subsided, and strain it.

LIQUOR PLUMBI ACETATIS. *Lond.*
Solution of Acetate of Lead.

Take of
Semivitrified oxide of lead, two pounds and four ounces;
Acetic acid, one gallon.
Mix and boil to six pints, constantly stirring, then set it aside. After the fæces have subsided, strain.

LIQUOR SUB-ACETATIS LITHARGYRI COMPOSITUS. *Dub.*
LIQUOR PLUMBI ACETATIS DILUTUS. *Lond.*
Compound Liquor of Acetated Litharge.

Take of
Liquor of acetated litharge, two (one, *Lond.*) drachms by weight;
Distilled water, two (one, *Lond.*) pints;

Weaker spirit of wine, two (one, *Lond.*) drachms, by measure.
(Mix the spirit and liquor of acetated litharge, then add the distilled water. *Dub.*)
(Mix, *Lond.*)

NOTWITHSTANDING Scheele shewed that a solution of sugar of lead was converted into Goulard, by allowing it to act for a day on a plate of lead, yet, until the experiments of Dr. Bostock, it was generally believed that these preparations did not differ, except in the accidental variations of strength to which the latter was subject. By his analysis, however, it appears that the constituents in the saturated solution of the sugar of lead, and of the water of acetated litharge, are respectively,

	Former.	Latter.
Oxide of lead	16.8	23.1
Acetic acid -	7.5	5.
Water -	75.7	71.9
	100.	100.

Thenard obtained the salt in crystallized plates, by boiling 150 parts of litharge in a solution of 100 parts of sugar of lead, and, on analyzing it, found it to consist of 17 acid, 78 oxide, and 5 water. From these experiments, it therefore appears, that the nomenclature of the salts, lately adopted by the London college, is most correct.

London.	*Dublin.*	*Edinburgh.*
Carbonas,	Sub-acetas plumbi.	Oxidum album.
Super-acetas,	Acetas,	Acetis.
Acetas,	Sub-acetas lithargyri.	

* * *

CHAP. XII.—TIN.

STANNI PULVIS. *Dub.*

Powder of Tin.

Take of
Tin, any quantity.
Having melted it over the fire in an iron mortar, agitate it until it be reduced to powder, which is to be passed, when cold, through a sieve.

THE college of Edinburgh do not give this preparation, inserting *Limatura et Pulvis Stanni* in their list of the materia medica.

Medical use.—It is often employed as a remedy against worms, particularly the tænia. The general dose is from a scruple to a drachm; some confine it to a few grains; but Dr. Alston assures us, that its success chiefly depends on its being given in much larger quantities. He directs an ounce of the powder on an empty stomach, mixed with four ounces of molasses; next day, half an ounce; and the day following, half an ounce more; after which, a carthartic is administered. He says, the worms are usually voided during the operation of the purge, but that pains of the stomach occasioned by them are removed almost immediately upon taking the first dose of the tin. This practice is sometimes successful in the expulsion of tæniæ, but by no means so frequently as Dr. Alston's observations would lead us to hope.

Blaine's powder, which certainly succeeds sometimes in curing the distemper in dogs, seems to be a sulphuretted oxide of tin.

CHAP. XIII.—ZINC.

OXIDUM ZINCI. *Edin.*

Oxide of Zinc.

Let a large crucible be placed in a furnace filled with live coals, so as to be somewhat inclined towards its mouth; and when the bottom of the crucible is moderately red, throw into it a small piece of zinc, about the weight of a drachm. The zinc soon inflames, and is, at the same time, converted into white flakes, which are to be from time to time removed from the surface of the metal with an iron spatula, that the combustion may be more complete; and at last, when the zinc ceases to flame, the oxide of zinc is to be taken out of the crucible. Having put in another piece of zinc, the operation is to be repeated, and may be repeated as often as is necessary. Lastly, the oxide of zinc is to be prepared in the same way as the carbonate of lime.

Dub.

Take of

Zinc, broken into pieces, any quantity.

Throw it at different times into a sufficiently deep crucible, heated red hot, and placed with its mouth inclined towards the mouth of the furnace. After each time that any zinc is thrown in, cover the crucible with another inverted over it, but loosely, so that the air may have access to the zinc. Preserve the white and very light sublimed powder for use.

Lond.

Inject successively pieces of zinc into a crucible, heated to whiteness. It must be large, deep, inclined to one side, and covered with another crucible, so that the zinc may be exposed to the action of the air, and may be stirred with an iron spatula. Immediately take out the oxide, which arises from time to time, and pass its white and lighter part through a sieve. Pour water upon this, and reduce it to an impalpable powder, as directed for chalk.

This is an instance of simple oxydizement. At a red heat, zinc attracts the oxygen of the atmosphere so strongly, that it is quickly covered with a crust of white oxide, which prevents the air from acting on the metal below; and therefore we are desired to operate only on small pieces at a time, and to place the crucible, so that we may easily take out the oxide formed, and introduce fresh pieces of zinc. As soon as the crust of oxide is broken or removed, the zinc inflames, and burns with a brilliant white, or greenish blue flame, being at the same time converted into very light white flocculi. To save these as much as possible, we are directed to use a very deep and large crucible, and to cover it with an inverted crucible. But as we must not cover it, so as to prevent the access of the air, it is doubtful whether the latter precaution be of much service. The greater part of the zinc is, however, oxidized in the crucible, without being previously converted into vapour; and as this portion of the oxide is always mixed with particles of zinc, it is necessary to separate them by trituration and elutriation.

The oxide thus obtained is of a pure white colour, without smell or taste, infusible and fixed in the fire, insoluble in water or alcohol, and entirely soluble in acids. The presence of lead in it is detected by sulphuric acid, which forms, in that case, an insoluble sulphate of lead. The white oxide of zinc contains 82.15 zinc, and 17.85 oxygen.

Medical use.—White oxide of zinc is applied externally as a detergent and exsiccant remedy. With twice its weight of axunge, it forms an excellent application to deep chops, or excoriated nipples. But, besides being applied externally, it has also, of late, been used internally. In doses from one to seven or eight grains, it has been much celebrated in the cure of epilepsy, and several spasmodic affections; and there are sufficient testimonies of its good effects, where tonic remedies in those affections are proper.

CARBONAS ZINCI IMPURUS PRÆPARATUS, olim LAPIS CALAMINARIS PRÆPARATUS. *Ed.*

Prepared Impure Carbonate of Zinc, formerly *Prepared Calamine.*

The impure carbonate of zinc, after being roasted by those who make brass, is prepared in the same way as carbonate of lime.

LAPIS CALAMINARIS PRÆPARATUS. *Dub.*

Prepared Calamine.

Reduce calcined calamine to powder, and separate the impalpable parts in the same manner that is directed in the preparation of chalk.

CALAMINA PRÆPARATA. *Lond.*

Prepared Calamine.

Burn the calámine; then triturate it; lastly, reduce it to an impalpable powder, in the manner directed for chalk.

As this oxide of zinc is intended for external application, and often to parts very easily irritated, too much pains cannot be bestowed in reducing it to a fine powder.

OXIDUM ZINCI IMPURUM PRÆPARATUM, olim TUTIA PRÆPARATA. *Ed.*

Prepared Impure Oxide of Zinc, formerly *Prepared Tutty.*

It is prepared as carbonate of lime.

THIS oxide is also prepared for external use only.

SULPHAS ZINCI. *Ed.*

Sulphate of Zinc.

Take of
Zinc, cut into small pieces, three ounces;
Sulphuric acid, five ounces;
Water, twenty ounces.

Mix them, and, when the effervescence is finished, digest the mixture, for a little, on hot sand; then strain the decanted liquor through paper, and, after proper evaporation, set it apart, that it may crystallize.

Dub.

Take of

Zinc, reduced to powder, in the manner directed for the powder of tin, three ounces;

Sulphuric acid, five ounces;

Water, one pint.

Put the zinc in a glass vessel, and gradually pour on the acid, previously diluted with the water. After the effervescence has ceased, digest a little; and, after due evaporation of the filtered liquor, set it aside to crystallize.

Lond.

Take of

Zinc, broken into bits, three ounces;

Sulphuric acid, five ounces;

Water, four pints.

Mix in a glass vessel; and after the effervescence has finished, strain the solution through paper, then evaporate to a pellicle, and set it aside to crystallize.

SULPHATE of zinc is chiefly found native in the mines of Goslar, sometimes in transparent pieces, but more commonly in the form of white efflorescences, which are dissolved in water, and afterwards reduced, by evaporation and crystallization, into large masses. But the sulphate of zinc of commerce is never pure, but always contains iron, copper, and a little lead. From the mode of its preparation, there is also a deficiency of acid and water of crystallization. The means formerly directed for purifying it by the London college supplied these, but did not separate the foreign metals, except perhaps the lead. If, therefore, a pure sulphate of zinc be wanted, we may, according to the directions of the colleges, dissolve pure zinc in pure sulphuric acid; but we believe this process is very rarely practised, especially as the common sulphate of zinc may be sufficiently purified by exposing it, in solution, to the air, by which means red oxide of iron is precipitated, and by digesting it upon pure zinc, which precipitates the other metals.

Sulphate of zinc crystallizes in tetrahedral prisms, terminated by pyramids. It has a metallic styptic taste; effloresces slowly when exposed to the air. It is soluble in 2.5 parts of water, at 60°, and in much less boiling water. It is not soluble in alcohol. It is decomposed by the alkalies, earths, and hydro-sulphurets. It consists of 20 oxide of zinc, 40 acid, and 40 water of crystallization.

Medical use.—Sulphate of zinc, in doses from ten grains to half a drachm, operates almost instantly as an emetic, and is at the same time perfectly safe. It is therefore given when immemediate vomiting is required, as in cases where poison has been swallowed. By employing it internally, in smaller doses, it acts as a tonic; and some think it, in every case, preferable to the oxide of zinc.

Externally, it is used as a styptic application, to stop hæmorrhagies, diminish increased discharges, as gonorrhœa, and to cure external inflammations, arising from debility and relaxation of the blood-vessels, as in some cases of ophthalmia. It is often prescribed in injections and collyria.

SOLUTIO SULPHATIS ZINCI. *Ed.*

Solution of Sulphate of Zinc.

Take of
Sulphate of zinc, sixteen grains;
Water, eight ounces;
Diluted sulphuric acid, sixteen drops.

Dissolve the sulphate of zinc in the water; then, having added the acid, filter through paper.

The acid is here added to dissolve the excess of oxide of zinc, which the common sulphate often contains. This solution is of a strength proper for injecting into the urethra in gonorrhœa, or applying to the eyes in chronic ophthalmia.

LIQUOR ALUMINIS COMPOSITUS. *Lond.*

Compound Alum Liquor.

Take of
Alum,
Sulphate of zinc, of each half an ounce;
Boiling water, two pints.

Dissolve the alum and sulphate of zinc together in the water, and filter through paper.

This water was long known in our shops, under the title of *Aqua aluminosa Bateana.*

It is used for cleansing and healing ulcers and wounds, and for removing cutaneous eruptions, the part being bathed with it hot three or four times a day. It is sometimes likewise employed as a collyrium, and as an injection in gonorrhœa and fluor albus, when not accompanied with virulence.

SOLUTIO ACETITIS ZINCI. *Ed.*

Solution of Acetate of Zinc.

Take of
Sulphate of zinc, one drachm;
Distilled water, ten ounces.

Dissolve,

Take of
  Acetite of lead, four scruples
  Distilled water, ten ounces.
Dissolve.

Mix the solutions; let them stand at rest a little, and then filter the liquor.

TINCTURA ACETATIS ZINCI. *Dub.*
Tincture of Acetate of Zinc.

Take of
  Sulphate of zinc,
  Acetate of kali, each one ounce.
Triturate them together, and add one pint of rectified spirit of wine.
Macerate for a week, with occasional agitation, and strain through paper.

THIS is a case of double elective attraction, the lead combining, and forming an insoluble compound with the sulphuric acid, while the zinc unites with the acetic acid, and remains in solution.

The acetate of zinc may be obtained by evaporation, in talcy crystals. It is soluble in water, and is decomposed by heat. It is not poisonous.

When crystallized acetate of lead and sulphate of zinc are triturated together, the mixture presently becomes moist, which is owing to the new compounds combining with less water of crystallization than the original salts, by which means a portion of the water is disengaged in its fluid form.

Medical use.—The solution of acetate of zinc is, with many practitioners, deservedly much esteemed as an astringent collyrium and injection. The solution in spirit of wine of the Dublin college, is stronger and more stimulant than that in water of the Edinburgh.

CHAP. XIV.

ALCOHOL, ETHER, AND ETHEREAL SPIRITS.

ALCOHOL. *Lond.*

Alcohol.

Take of

Rectified spirit of wine, one gallon;
Subcarbonate of potass, three pounds;

Put one pound of the subcarbonate, previously heated to 300° Fahr. into the spirit, and macerate for twenty-four hours, frequently stirring them; then decant the spirit, and add the remainder of the subcarbonate of potass, heated to the same degree; and, lastly, distil off the alcohol, which is to be kept in a well corked bottle.

The specific gravity of alcohol is to that of distilled water as 815 to 1000.

Dub.

Take of

Rectified spirit of wine, one gallon;
Pearl ashes, dried at 300° Fahr. and still warm, one pound;
Caustic kali, in powder, one ounce;
Muriate of lime, dried, half a pound.

Mix the spirit and kali; add the pearl-ashes, previously reduced to powder, and digest the mixture for three days, in a close vessel, frequently agitating it; then pour off the spirit, mix with it the muriate of lime, and distil, with a moderate heat, until the residuum begins to grow thick.

The specific gravity of this spirit is to that of distilled water as 815 to 1000.

The muriate of lime may be conveniently obtained from the residuum, in the preparation of water of caustic ammonia.

THE theory of these processes has been already explained, and also the superiority of muriate of lime over carbonate of potass, for separating the last portions of water from alcohol. The Edinburgh college give no directions for the preparation of a perfectly pure alcohol, as it is never used in pharmacy; but it is perhaps to be regretted, that they have given the title of alcohol to a liquid which is not the alcohol of chemists.

ÆTHER SULPHURICUS. *Ed.*

Sulphuric Ether.

Take of
Sulphuric acid,
Alcohol, each thirty-two ounces.

Pour the alcohol into a glass retort, capable of sustaining a sudden heat, and add to it the acid, in an uninterrupted stream. Mix them by degrees, shaking them moderately and frequently, and instantly distil from sand, previously heated for the purpose, into a receiver kept cool with water or snow. The heat must also be so managed, that the liquor shall boil as soon as possible, and continue to boil till sixteen ounces are drawn off, when the retort is to be removed from the sand.

To the distilled liquor add two drachms of potass, and distil from a very high retort, with a very gentle heat, into a cool receiver, until ten ounces have been drawn off.

If sixteen ounces of alcohol be poured upon the acid remaining in the retort after the first distillation, and the distillation be repeated, more ether will be obtained; and this may be repeated several times.

Dub.

Take of
Sulphuric ethereal liquor, twenty ounces, by measure;
Subcarbonate of kali, dried and powdered, two drachms.

Mix them, and distil, with a very gentle heat, twelve ounces, by measure, from a very high retort into a cooled receiver.

Its specific gravity is 765, water being 1000.

Lond.

Take of
Rectified spirit,
Sulphuric acid, of each one pound and a half.

Put the spirit into a glass retort, and gradually add to it the acid, shaking them frequently, and taking care that the temperature, during the mixture, do not exceed 120° Fahr. Then cautiously place the retort in a sand-bath, previously heated to 200°, so that the liquor may boil as quickly as possible, and the *ether* may be distilled over into a tubulated receiver, to which a vessel, cooled with snow or ice, is fitted. Continue the distillation until a heavier fluid begin to come over, which is seen in the bottom of the receiver below the ether.

Pour twelve ounces more of rectified spirit upon the liquor remaining in the retort, and repeat the distillation in the same manner.

ÆTHER RECTIFICATUS. *Lond.*
Rectified Æther.

Take of
Sulphuric ether, fourteen fluidounces;
Fused potass, half an ounce;
Distilled water, two fluidounces.

Dissolve the potass first in the water, and add the ether to it, shaking them constantly until they are mixed. Lastly, distil from a large retort, with a heat of about 120°, twelve fluidounces of rectified ether.

ÆTHER SULPHURICUS CUM ALCOHOLE. *Ed.*
Sulphuric Ether with Alcohol.

Take of
Sulphuric ether, one part;
Alcohol, two parts.

Mix them.

SPIRITUS ÆTHERIS SULPHURICI. *Lond.*
Spirit of Sulphuric Ether.

Take of
Sulphuric ether, half a pint;
Rectified spirit, a pint.

Mix them.

LIQUOR ÆTHEREUS SULPHURICUS. *Dub.*
Sulphuric Ethereal Liquor.

Take of
Rectified spirit of wine,
Sulphuric acid, each thirty-two ounces, by weight.

Put the spirit, heated to 120°, into a glass retort, capable of supporting a sudden heat, and pour upon it the acid, in a continued stream. Mix them gradually, and distil into a cool receiver twenty ounces of liquor, by measure, with a sufficient and quick heat.

If sixteen ounces of rectified spirit of wine be poured upon the residuum in the retort, it will again afford, by distillation, sulphuric ethereal liquor.

OLEUM ÆTHEREUM. *Lond.*
Ethereal Oil.

After the distillation of sulphuric ether, continue the distillation, with a reduced heat, until a black froth swell up. Immediately remove the retort from the fire, and pour water upon the liquor which remains in the retort. Skim off the oily matter which swims upon the top of the water, and mix it with as much lime-water as will saturate the acid in it. Shake them together; and, lastly, collect the ethereal oil, after it has separated.

SPIRITUS ÆTHERIS COMPOSITUS. *Lond.*

Compound Spirit of Ether.

Take of
- Spirit of sulphuric ether, one pint;
- Æthereal oil, two fluiddrachms.

Mix them.

LIQUOR ÆTHEREUS OLEOSUS. *Dub.*

Oily Ethereal Liquor.

Take what remains in the retort after the distillation of the vitriolic ether.

Distil to one half, with a moderate heat.

THE products arising from the decomposition of alcohol by the action of the acids are extremely curious and interesting. The theory of the formation was not understood until lately, when it was very ingeniously attempted by Fourcroy and Vauquelin, who endeavour to shew that the acid remains unchanged, and that the alcohol is converted into ether, water, and charcoal.

The most convenient way of mixing the ingredients, is to put the alcohol, previously heated, into a tubulated retort, and, with a long-tubed funnel, reaching down to the bottom of the retort, to pour in the acid. By cautious agitation, the two fluids unite, and heat is produced, which may be taken advantage of in the distillation, if we have a sand bath previously heated to the same degree, to set the retort into immediately after the mixture is completed; nor is there any occasion for a tubulated receiver, if we immerse the ordinary receiver, which ought to be large, in water, or bury it in broken ice.

The distillation should be performed with an equal and very gentle, but quick heat. The juncture of the retort and recipient is to be luted with a paste made of linseed meal, and further secured by a piece of wet bladder.

Immediately on mixing the acid with the alcohol, there is a considerable increase of temperature, and a slight disengagement of alcohol, somewhat altered, and having an aromatic odour. On placing the retort in the sand bath, a portion of pure alcohol first comes over; and when the mixture in the retort boils, the ether rises, and is condensed in thin, broad, straight streaks, having the appearance of oil. Until the liquor which passes over into the receiver amounts to about half, or somewhat more than half, of the alcohol operated on, it consists almost entirely of alcohol and ether, and there has been no disengagement of any permanently elastic fluid: but now the production of ether ceases, and sulphureous vapours begin to arise, which condense in irregular streaks, or in drops: we must therefore either put a stop to the process, or change the receiver. In the latter case, the products are sulphureous acid, acetic acid, water, and oil of wine, as it was called, accompanied towards the end by a peculiar species of carburetted hydrogen gas, called by the Dutch chemists Olefiant gas; because, when mixed with oxygenized muriatic acid, it forms oil. At last the matter in the retort, which has now become thick and black, swells up, and prevents us from carrying the process further.

If we stop the process before the sulphureous vapours arise, the whole acid, diluted with a proportion of water, and mixed with charcoal, remains in the retort; but if we allow the process to go on, there is a continual decomposition of the acid, which is therefore diminished in quantity. In either case, according to Proust, the sulphuric acid may be obtained from the black residuum in the retort, by diluting it with twice its weight of water, filtering it through linen, and evaporating it till it acquire the specific gravity 1.84, then adding about one five-hundredth part of nitrate of potass, and continuing the evaporation until the acid become perfectly colourless, and acquire the specific gravity of 1.86. The residuum, however, may be more advantageously preserved, as the colleges direct, for preparing more ether, by repeating the process with fresh quantities of alcohol. Proust indeed denies that this residuum is capable of converting more alcohol into ether; but that excellent chemist has somehow fallen into an error; for it is a fact, that was known in the time of that no less excellent chemist Dr. Lewis, and inserted in the first edition of his Dispensatory, published in 1753, and not a recent discovery of Citizen Cadet, as Fourcroy would lead us to believe. If farther confirmation be wanted, we shall instance Göttling, who says, that from three or four pounds of this residuum he has prepared 60 or 70 pounds of the spirit of vitriolic ether, and more than twelve pounds of vitriolic ether, without rectifying the residuum, or allowing the sulphureous vapour to evaporate.

The ether may be separated from the alcohol and sulphureous acid, with which it is always mixed, by re-distilling it with a very gentle heat, after mixing it with potass, or rather lime, which combine with the acid, or with black oxide of manganese, which converts the sulphureous into sulphuric acid, and thus deprives it of its volatility.

Medical use.—The chemical properties of ether have been already noticed. As a medicine taken internally, it is an excellent antispasmodic, cordial, and stimulant. In catarrhal and asthmatic complaints, its vapour is inhaled with advantage, by holding in the mouth a piece of sugar on which ether has been dropt. It is given as a cordial in nausea, and in febrile diseases of the typhoid type; as an antispasmodic in hysteria, and in other nervous and painful diseases; and as a stimulus in soporose and apoplectic affections. Regular practioners seldom give so much as half an ounce, much more frequently only a few drops, for a dose; but empirics have sometimes ventured upon much larger quantities, and with incredible benefit. When applied externally, it is capable of producing two very opposite effects, according to its management; for, if it be prevented from evaporating, by covering the place to which it is applied closely with the hand, it proves a powerful stimulant and rubefacient, and excites a sensation of burning heat. In this way it is frequently used for removing pains in the head or teeth. On the contrary, if it be dropt on any part of the body, exposed freely to the contact of the air, its rapid evaporation produces an intense degree of cold; and as this is attended with a proportional diminution of bulk in the part to which it is applied, in this way it has frequently facilitated the reduction of strangulated hernia.

The mixture of ether with alcohol, whether prepared directly, by mixing them as the Edinburgh college direct, or in the impure state in which it comes over in the first part of the process for distilling ether, possesses similar virtues with ether, but in an inferior degree.

ÆTHER NITROSUS. *Dub.*
Nitrous Ether.

Take of
Nitrate of kali, dried, and in coarse powder, a pound and a half;
Sulphuric acid, one pound;
Rectified spirit of wine, nineteen ounces, by measure.

Put the nitrate of kali into a tubulated retort, placed in a bath of cold water, and pour upon it gradually, and in different portions, the sulphuric acid and spirit, previously mixed, and allowed to cool after having been mixed. Without any external heat, or only a very slight degree of it (such as the addition of tepid water to the bath), an ethereal liquor will begin to arise, without applying fire under it. In a short sime, the heat will spontaneously increase in the retort, and a remarkable ebullition will take place, which are to be moderated, by cooling the bath with cold water. The receiver ought also to be cooled with water or snow, and furnished with a proper apparatus for transmitting the very elastic vapour (arising from the mixture, with very great force, if the heat should accidentally become too high) through a pound of rectified spirit of wine, placed in a cooled phial.

Put the ethereal liquor, which has distilled spontaneously, into a phial with a ground-glass stopper, and gradually add (closing the phial after each addition), as much very dry subcarbonate of kali, in powder, as shall be sufficient to saturate the superabundant acid, according to the test of lithmus. This is done commonly on the addition of about a drachm of the salt; and, in a short time, the nitrous ether will swim on the surface, and is to be separated by means of a funnel.

If it be required very pure, re-distil the ether from a water bath, at about 140°, to one half.

Its specific gravity is 900.

WHEN alcohol and nitrous acid are mixed in the proportion necessary for the formation of nitrous ether, the utmost precautions must be taken to diminish their action on each other. Dr. Black contrived a very ingenious method of doing this, by rendering their mixture extremely slow. On two ounces of strong nitrous acid, put into a phial, having a conical ground glass stopper, and a weak spring fitted to keep the stopper in its place, pour slowly and gradually about an equal quantity of water, which, by being made to trickle down the sides of the phial, will float on the surface of the acid without mixing with it; then add, in the same cautious manner, three ounces of alcohol, which, in its turn, will float on the surface of the water. By this means the three fluids are kept separate, on account of their different specific gravities, and a stratum of water is interposed between the acid and spirit. The phial is now to be set in a cool place, and the acid will gradually ascend, and the spirit descend, through the water; this last acting as a boundary to restrain their action on each other. When this commences, bubbles of gas rise through the fluids, and the acid gets a blue colour, which it again loses in the course of a few days, and a yellow nitrous ether begins to swim on the surface. As soon as the formation of air bubbles ceases, it is time to remove the ether formed; for if allowed to remain, its quantity decreases. By this method, nitrous ether is formed, without the danger of producing any explosion. The residuum of this process is still capable of forming a spirit of nitrous ether, with an additional quantity of alcohol.

By adding the acid to the alcohol in very small quantities, and at considerable intervals, Mr. Dehne procured from two pounds of alcohol, and one pound ten ounces and three drachms of nitrous acid, one pound nine ounces and three drachms of ether: the residuum weighed one pound twelve ounces. There was therefore a loss of five ounces. Mr. Dehne put the alcohol into a tubulated retort, to which a receiver was luted, and poured the acid through the tubulature, and the ether passed over into the receiver, without the application of any heat. The action of the acid on the alcohol did not begin until six ounces and a half were added, and was found to be exhausted, when, on adding more acid, it fell to the bottom in the form of green drops. By using Mr. Dehne's precaution, of adding the acid gradually, I prepared nitrous ether in a Woulfe's apparatus, with perfect ease and safety, although Fourcroy represents it as a most dangerous operation. I introduced the acid gradually through a funnel luted into the tubulature of the retort. The tube of the funnel was very long, and its extremity was immersed in the alcohol in the retort. This simple contrivance not only enabled me to add to the acid as I pleased, but also acted as a tube of safety.

The method of forming nitrous ether, now directed by the Dublin college, is indeed said to be preferable to those mentioned. It was first practised by M. Voigt.

When alcohol is converted into ether by the action of nitrous acid, the change produced on it is nearly the same with that produced by sulphuric acid; but, in the latter case, it is effected by the affinities which form water, and charcoal is precipitated; and in the former, by the affinities which form carbonic acid, and no water is produced.

Nitrous ether seems to differ from sulphuric ether only in being combined with nitric oxide; at least it is highly inflammable, pungent, volatile, and is not soluble in water, while it gives a deep olive colour to green salts of iron, and has a considerable specific gravity. When simply washed with water, I found it 0.912; when the acid which it evidently contained was removed, by saturating it with potass, it became 0.896; and when rectified, by re-distilling it, it became 0.866, but recovered decidedly acid properties, probably from the nitric oxide being acidified by the air of the apparatus.

SPIRITUS ÆTHERIS NITROSI. *Ed.*

Spirit of Nitrous Ether.

Take of

Alcohol, three pounds;

Nitrous acid, one pound.

Pour the alcohol into a capacious phial, placed in a vessel full of cold water, and add the acid by degrees, constantly agitating them. Let the phial be slightly covered, and placed for seven days in a cool place; then distil the liquor, with the heat of boiling water, into a receiver kept cool with water or snow, till no more spirit comes over.

SPIRITUS ÆTHEREUS NITROSUS. *Dub.*
Nitrous Ethereal Spirit.

Add to the matter which remains after the distillation of the nitrous ether, the rectified spirit of wine, which was employed in that operation for condensing the elastic vapours, and distil, with the greatest heat of a water bath, to dryness. Mix the distilled liquor with the alkaline liquor which remained after the separation of the nitrous ether, and also add as much very dry sub-carbonate of kali as shall be sufficient to saturate the predominant acid, according to the test of lithmus. Lastly, distil by the medium heat of a water bath as long as drops come over.

The specific gravity of this liquor is 850.

SPIRITUS ÆTHERIS NITRICI. *Lond.*
Spirit of Nitric Ether.

Take of

Rectified spirit of wine, two pints;
Nitrous acid, three ounces.

Mix them, by pouring in the acid to the spirit, and distil with a gentle heat one pound ten ounces.

THE action of alcohol and nitrous acid upon each other is much influenced by their proportions. If we use a small proportion of alcohol, or pour alcohol into nitrous acid, there immediately takes place a great increase of temperature, and a violent effervescence and disengagement of red fumes. On the contrary, by placing the phials containing the alcohol and acid in cold, or rather iced water, they may be mixed, without danger, in the proportions directed by the colleges; and if the acid be added in small quantities at a time, and each portion thoroughly mixed with the alcohol by agitation, I find that no action takes place until heat be applied. It is therefore unnecessary to keep the mixture for seven days; but we may immediately proceed to the distillation, which must be performed with a very slow and well regulated fire; for the vapour is very apt to expand, with so much violence as to burst the vessels; and the heat must at no time exceed 212°, otherwise a portion of undecomposed acid will pass over, and spoil the product. By performing this operation carefully in a Woulfe's apparatus, I got, in the receiver, from three ounces of alcohol, specific gravity 0.841, and one ounce of nitrous acid, two ounces four drachms of spirit of nitrous ether, specific gravity 0.887. Eight ounces of alcohol, contained in the first phial connected with the receiver, gained one drachm and a half, and acquired specific gravity 0.873, and eight ounces of water in the second, 18 grains: the residuum weighed seven drachms and a half. There was therefore a loss of two drachms

42 grains of permanently elastic fluids. The first portion of these that was examined seemed to be the air of the apparatus: in the next, the candle burnt with an enlarged and brightened flame: was it nitrous oxide? and all that passed afterwards was a mixture of carbonic acid and the etherized nitrous gas first described by the Dutch chemists. When recently prepared, this gas is inflammable, and does not form red fumes on coming into contact with atmospheric air: but when attempted to be kept over water, the water becomes acidulous, the gas is diminished in bulk about two thirds, loses its inflammability, and is now converted into red vapour on the admission of atmospheric air. It therefore appears to consist of nitric oxide gas, holding ether in chemical solution. I have formed a similar gas, by admitting a few drops of ether to nitrous oxide gas over mercury.

The Edinburgh college directs the distillation to be continued till no more spirit comes over. But how is this to be ascertained? After having drawn off about two thirds, according to the directions of the London college, I again applied heat to the retort; and examining the air, which began to come over into the pneumonic apparatus, by carelessly approaching a lighted candle to the extremity of the tube, it kindled, and burst the whole with a violent explosion.

The spirit of nitrous ether, thus obtained, is a colourless fluid, of a fragrant odour, lighter than water, extremely volatile and inflammable, possessing properties in general analogous to the spirit of sulphuric ether, but of considerably greater specific gravity, striking a deep olive, with a solution of green sulphate of iron, and often, if not always, acid. By age and exposure to the air, it is gradually decomposed, and gives rise to the re-production of nitrous acid. When this change has taken place, it may be rectified, by saturating the acid with lime-water, and re-distilling the ethereal fluid.

In all probability, spirit of nitrous ether is a mixture of nitrous ether and alcohol; for, by diminishing the quantity of alcohol employed, we obtain a fluid having a similar relation to the spirit of nitrous ether that sulphuric ether has to the spirit of sulphuric ether. By adding alcohol to the residuum of nitrous ether, the Dublin college prepare their spirit of nitrous ether, in the same way as spirit of sulphuric ether is prepared from the residuum of sulphuric ether; and by mixing nitrous ether with alcohol, we obtain a fluid exactly resembling spirit of nitrous ether.

Medical use.—Spirit of nitrous ether has been long deservedly held in great esteem. It quenches thirst, promotes the natural secretions, expels flatulencies, and moderately strengthens the stomach. It may be given in doses of from twenty drops to a drachm, in any convenient vehicle. Mixed with a small quantity of spiritus ammoniæ aromaticus, it proves a mild, yet efficacious diaphoretic, and often remarkably diuretic; especially in some febrile cases, where such a salutary evacuation is wanted. A small proportion of this spirit added to malt spirits, gives them a flavour approaching to that of French brandy.

CHAP. XV.—VEGETABILIA. *Lond.*

Vegetables.

Vegetables are to be gathered in their native soil and situation, and in a dry season, when they are neither wet with showers nor dew; they are to be collected every year, and what are older, must be thrown away.

Roots, for the most part, are to be dug up before they shoot up their leaves or stalks.

Barks ought to be gathered, when they can be separated most easily from the wood.

Leaves are to be plucked after the flowers have faded, and before the seeds are ripe.

Flowers are to be gathered when just opened.

Seeds are to be collected when ripe, and before they fall, and are to be kept in their proper coverings.

VEGETABILIUM PRÆPARATIO. *Lond.*

Preparation of Vegetables.

VEGETABLES, soon after they are gathered, except those which are used fresh, are to be loosely spread out, and dried as quickly as possible, with a heat so low as not to alter the colour. They are then to be preserved from the action of light and moisture in proper situations or vessels.

ROOTS, which are prescribed fresh, are to be buried in sand. The SQUILL, before drying it, is to have its dry coats peeled off, and to be cut transversely into thin slices.

HERBARUM ET FLORUM EXSICCATIO. *Ed.*

The Drying of Herbs and Flowers.

HERBS and flowers are to be dried by the gentle heat of a stove or common fire, in such quantities at a time, that the process may be finished as quickly as possible: for by this means their powers are best preserved; the test of which is the perfect preservation of their natural colour.

The leaves of hemlock (*conium maculatum*), and of other plants containing a subtile volatile matter, must be immediately reduced to powder, after being dried, and afterwards kept in glass phials well corked.

Dub.

Put the fresh leaves of the herb in flower into paper bags, and expose them to a low degree of heat for an hour; then spread them lightly upon a sieve, and dry them as quickly as possible, taking care that the green colour be not injured by too great a degree of heat: but if the herbs are to be used in the form of powder, they are to be powdered immediately, and preserved in small opaque phials well corked.

Herbs and flowers, from which waters or oils are to be distilled, should be dried as soon as they are gathered.

PULVIS SCILLÆ. *Dub.*

Powder of Squills.

Cut the squills, after having removed their membranaceous integuments, into transverse slices; dry these on a sieve with a gentle heat, and reduce them to powder, which is to be kept in phials with ground stoppers.

SCILLA MARITIMA EXSICCATA. *Ed.*

Dried Sea Squill.

Cut the root of the sea-squill, after having removed its external coat, transversely into thin slices, and dry it by a gentle heat. The sign of its being properly dried is, that although rendered friable, it retains its bitterness and acrimony.

By this method, the squill dries much sooner than when its several coats are only separated; the internal part being here laid bare, while, in each of the entire coats, it is covered with a thin skin, which impedes the exhalation of the moisture. The root loses in this process four fifths of its original weight; the parts which exhale with a moderate heat appear to be merely watery: hence six grains of the dry root are equivalent to half a drachm of it when fresh; a circumstance to be particularly regarded in the exhibition of this medicine. But if too great heat has been employed in drying it, it becomes almost inert, and it also loses its virtues by long keeping in the state of powder.

Dried squills furnish us with a medicine, sometimes advantageously employed as an emetic, often as an expectorant, and still more frequently as a powerful diuretic.

PULVIS SPONGIÆ USTÆ. *Dub.* SPONGIA USTA. *Lond.*
Powder of Burnt Sponge.

Cut the sponge in pieces, and bruise it, so as to free it from small stones; burn it in a covered iron vessel, until it becomes black and friable; afterwards reduce it to a very fine powder.

THIS medicine has been in use for a considerable time, and employed against bronchocele, scrofulous disorders, and cutaneous foulnesses, in doses of a scruple and upwards. Its virtues probably depend on the presence of a little alkali. It also contains charcoal, and its use may be entirely superseded by these substances, which may be obtained in other manners, at a much cheaper rate.

PULVIS QUERCUS MARINÆ. *Dub.*
Powder of Yellow Bladder Wrack.

Take of

Yellow bladder wrack, in fruit, any quantity.

Dry and clean it; then expose it to the fire of an iron pot or crucible, covered with a perforated lid, until, after the escape of the vapours, the mass becomes of a dull red. Reduce the carbonaceous mass which remains to very fine powder, and keep it in close vessels.

THIS charcoal was formerly known under the name of *Æthiops Vegetablis.* It is analogous to the preceding article.

CHAP. XVI.—EXPRESSED JUICES.

THE juices of succulent plants are obtained by expression. They are of a very compound nature, consisting of the sap, the secreted fluids, and fecula, mixed together. When first procured, they are very high coloured, turbid, and loaded with parenchymatous matter. They may be purified by rest, filtration, heat, and clarification. Rest may be employed with juices, which are very fluid, do not contain volatile matter, and are not susceptible of alteration, and with sub-acid juices, as that of lemon. By rest these undergo a kind of slight fermentation, and all their mucilaginous, and other viscid parts, separate. Filtration is perhaps the most perfect means of defecation, but it is tedious, and applicable only to very fluid juices. In many instances it may be facilitated by the addition of water. The action of heat is more expeditious, and is employed for juices which are very alterable, or which contain volatile matters. It is performed by introducing the juice into a matrass, and immersing it in boiling water for some minutes. The feculæ are coagulated, and easily separated by filtration. Clarification by white of egg can only be used for very viscid mucilaginous juices, which contain nothing volatile. The white of two eggs may be allowed to each pint of juice. They are beat to a fine froth, the juice gradually mixed with them, and the whole brought to ebullition. The albumen coagulating envelopes all the parenchymatous and feculent matters, and the juice now passes the filter readily. By this process, juices are rendered sufficiently fine; but the heat employed deepens their colour, and manifestly alters them, so that it is not merely a defecating, but a decomposing process. When depurated, juices are yellow or red, but never green.

The fluids thus extracted from succulent fruits, whether acid or sweet, from most of the acrid herbs, as scurvy-grass and water-cresses, from the acid herbs, as sorrel and wood-sorrel, from the aperient lactescent plants, as dandelion and hawkweed, and from various other vegetables, contain great part of the peculiar taste and virtues of the respective subjects. The juices, on the other hand, extracted from most of the aromatic herbs, have scarcely any thing of the flavour of the plants, and seem to differ little from decoctions of them made in water boiled till the volatile odorous parts have been dissipated. Many of the odoriferous flowers, as the lily, violet, hyacinth, not only impart nothing of their fragrance to their juice, but have it totally destroyed by the previous bruising. From want of sufficient attention to these particulars, practitioners have been frequently deceived in the effects of preparations of this class: juice of mint has been often prescribed as a stomachic, though it wants those qualities by which mint itself and its other preparations operate.

There are differences as great in regard to their preserving those virtues, and this independently of the volatility of the active matter, or its disposition to exhale. Even the volatile virtue of scurvy-grass may, by the above method, be preserved almost entire in its juice for a considerable time; while the active parts of the juice of the wild cucumber quickly separate and settle to the bottom, leaving the fluid part inert.

Juices of arum root, iris root, bryony root, and other vegetables, in like manner allow their medicinal parts to settle at the bottom.

If juices are intended to be kept for any length of time, about one-fortieth part of their weight of good spirit of wine may be added, and the whole suffered to stand as before: a fresh sediment will now be deposited, from which the liquor is to be poured off, strained again, and put into small bottles which have been washed with spirit and dried. A little oil is to be poured on the surface, so as very nearly to fill the bottles, and the mouths closed with leather, paper, or stopped with straw, as the flasks are in which Florence oil is brought to us: this serves to keep out dust, and suffers the air to escape, which, in process of time, arises from all vegetable liquors, and which would otherwise endanger the bursting of the glasses; or, being imbibed afresh, render their contents vapid and foul. The bottles are to be kept on the bottom of a good cellar or vault, placed up to the necks in sand. By this method some juices may be preserved for a year or two; and others for a much longer time, though, whatever care be taken, they are found to answer better when fresh; and from the difficulty of preserving them, they have of late been very much laid aside, especially since we have been provided with more convenient and useful remedies. The following is the only composition of the kind retained in our Pharmacopœias.

SUCCUS COCHLEARIÆ COMPOSITUS. *Ed.*

Compound Juice of Scurvy-grass.

Take of
Juice of Scurvy-grass,
Water-cresses expressed from fresh-gathered herbs,
Seville oranges, of each two pounds;
Spirit of nutmegs, half a pound.

Mix them, and let them stand till the fæces have subsided, then pour off the clear liquor.

COMPOSITIONS of this kind are of considerable use for the purposes expressed in the title: the orange juice is an excellent assistant to the scurvy-grass, and other acrid antiscorbutics, which, when thus mixed, have been found from experience to produce much better effects than when employed by themselves. They may be taken in doses from an ounce or two to a quarter of a pint, two or three times a-day; they generally increase the urinary secretion, and sometimes induce a laxative habit.

CHAP. XVII.—INSPISSATED JUICES.

THIS is a very convenient form for the exhibition of those substances which are sufficiently succulent to afford a juice by expression, and whose virtues do not reside in any very volatile matter. By inspissation, the bulk of the requisite dose is very much diminished; they are reduced to a form convenient for making up into pills; and they are much less apt to spoil than the simple expressed juices. The mode of their preparation is not yet, however, reduced to fixed principles. Some direct the juices to be inspissated as soon as they are expressed; others allow them previously to undergo a slight degree of fermentation; some defecate them before they proceed to inspissate them; and, lastly, Baumé prepares his elaterium by inspissating the defecated juice of the wild cucumber, while our colleges give the same name to the matter which subsides from it. The nature of the soil, of the season, and many other circumstances, must materially alter the quantity or nature of the product. In moist years, Baumé got from thirty pounds of elder berries, four or five pounds of inspissated juice, and in dry years only two, or two and a half. From hemlock he got, in October 1769, 7.5 per cent. of inspissated juice, and in May of the same year only 3.7; on the contrary, in August 1768, 4 per cent. and in May 1770, 6.5; but, in general, the product in the autumn months was greatest.

SUCCUS SPISSATUS ACONITI NAPELLI. *Ed.*
Inspissated Juice of Wolfsbane.

Bruise the fresh leaves of wolfsbane, and, including them in a hempen bag, compress them strongly till they yield their juice, which is to be evaporated in flat vessels heated with boiling water, saturated with muriate of soda, and immediately reduced to the consistence of thick honey.

After the mass has become cold, let it be put up in glazed earthen vessels, and moistened with alcohol.

SUCCUS SPISSATUS CICUTÆ. *Dub.*
Inspissated Juice of Hemlock.

Express the leaves of hemlock, gathered when the flowers are just appearing, and allow the juice to stand six hours, until the fæces subside; then reduce the decanted juice to the thickness of an extract, with a moderate heat.

In this manner prepare

SUCCUS SPISSATUS	*The inspissated juice of*
ATROPÆ BALLADONNÆ. *Ed.*	*Deadly Nightshade*, from the leaves.
ACONITI NAPELLI. *Ed.*	*Wolfsbane*, from the leaves.
CONII MACULATI. *Ed.*	*Hemlock*, from the leaves, when it is about to flower.
CICUTÆ. *Dub.*	
HYOSCIAMI NIGRI. *Ed.*	*Henbane*, from the leaves.
HYOSCIAMI. *Dub.*	
LACTUCÆ VIROSÆ. *Ed.*	*Poisonous Lettuce*, from the leaves.
SAMBUCI. *Dub.*	*Elder berries.*

SUCCUS SPISSATUS SAMBUCI NIGRI, vulgo ROB SAMBUCI. *Ed.*
Inspissated Juice of Elder berries, commonly called *Elder Rob.*

Take of
Juice of ripe elder berries, five pounds;
Refined sugar, one pound.

Evaporate with a gentle heat, to the consistence of pretty thick honey.

THESE inspissated juices contain the virtues of the respective vegetables in a very concentrated state. Those of the elder, black currant, and lemon, are acidulous, cooling, and laxative, and may be used in considerable quantities, while those of the wolfsbane, hemlock, deadly nightshade, henbane, and poisonous lettuce, are highly narcotic and deleterious, and must b given only in very small doses.

FECULA.

SUCCUS SPISSATUS MOMORDICÆ ELATERII, vulgo ELATERIUM. *Ed.*
Inspissated Juice of the Wild Cucumber. Elaterium.

Slice ripe wild cucumber; express the juice very gently, and strain it through a very fine hair sieve; then boil it a little, and set it by some hours, until the thicker part has subsided. The thinner super-natant fluid is to be poured off, and separated from the rest by filtering, and the thicker part, which remains after filtration, is to be covered with a linen cloth, and dried with a gentle heat.

ELATERIUM. *Dub.*
Elaterium.

Slice ripe wild cucumbers, express the juice very gently, and strain it through a very fine hair sieve, into a glass vessel. Then set it aside for some hours, until the thicker part subside. Reject the supernatant liquor, and dry the feculum, laid upon and covered with a linen cloth.

EXTRACTUM ELATERII. *Lond.*
Extract of Elaterium.

Slice ripe wild cucumbers, and express the juice very gently through a hair sieve into a glass vessel; then set it at rest for some hours, until the thicker part subside. Throw away the thinner supernatant fluid, and dry the thicker part with a gentle heat.

THIS is not properly an inspissated juice, but a deposition from the expressed juice. Such depositions have long been called Fecula, and the denomination has been confirmed in modern times. Its application, however, appears to us to be too extended; for fecula is applied both to mild and nutritious substances, such as starch, and to drastic substances, such as that of which we are now treating. Besides, if it possessed exactly the same chemical properties as starch, it would be converted into a gelatinous mass by the boiling directed by the Edinburgh college, and would not separate; whereas the boiling is intended to promote the separation.

Common filtration through paper does not succeed here: the grosser parts of the juice, falling to the bottom, form a viscid cake upon the paper, which the liquid cannot pass through. The separation is to be effected by draining the fluid from the top, by placing one end of some moistened strips of woollen cloth, skeins of cotton, or the like, in the juice, and laying the other end over the edge of the vessel, so as to hang down lower than the surface of the liquor.

Medical use.—Elaterium is a very violent hydrogogue cathartic. In general, previous to its operation, it excites considerable sickness at stomach, and frequently produces severe vomiting. It is therefore seldom employed till other remedies have been tried in vain. But in some instances of ascites, it will produce a complete evacuation of water, where other cathartics have had no effect. Two or three grains are, in general, a sufficient dose, although perhaps the best mode of exhibiting it is by giving it only to the extent of half a grain at a time, and repeating that dose every hour, till it begins to operate.

PULPS.

PULPARUM EXTRACTIO. *Ed.*
Extraction of Pulps.

Boil unripe pulpy fruits, and ripe ones, if they be dry, in a small quantity of water, until they become soft; then press out the pulp through a hair sieve, and afterwards boil it down to the consistence of honey, in an earthen vessel, over a gentle fire, taking care to stir the matter continually, to keep it from burning.

The pulp of *Cassia fistularis* is, in like manner, to be boiled out from the bruised pod, and reduced afterwards to a proper consistence, by evaporating the water.

The pulps of fruits that are both ripe and fresh are to be expressed through the sieve, without any previous boiling.

Dub.

Fruits, whose pulps are to be extracted, if they be unripe, or ripe and dry, are to be boiled in a little water until they become soft. Then the pulps, expressed through a hair sieve, are to be evaporated to a proper degree of thickness.

PULPARUM PRÆPARATIO. *Lond.*
The Preparation of Pulp.

Set *pulpy fruits*, if they be unripe, or ripe and dry, in a moist place, that they may become soft; then press the pulps through a hair sieve: afterwards boil them with a gentle heat, and stir them frequently; and, lastly, evaporate the water in a water-bath, saturated with sea-salt, until the pulps acquire the proper consistency.

Pour boiling water on the bruised pods of the *Cassia lomentis*, so as to wash out the pulp; then press the matter, first through a coarse sieve, and afterwards through a hair sieve; lastly, evaporate the moisture in a water-bath, so as to reduce the pulp to a proper consistency.

Express the pulps of ripe recent fruits through a sieve, without boiling them.

WHEN these fruits are not sufficiently juicy to afford a pulp by simple expression, the decoction ordered by the Edinburgh and Dublin colleges is much more certain, and in every respect preferable to exposing them to a moist air, which is not only often inefficacious, but is apt to render them spoilt and mouldy. On the other hand, the precaution used by the London college, of finishing the evaporation in a water-bath, is highly proper, as otherwise they are extremely apt to become empyreumatic.

The pulps expressed from recent substances, without coction, are less mucilaginous, are more apt to allow their fluid parts to separate, when left at rest, than when they have been previously boiled. Very succulent vegetables, such as apples, pears, and lily roots, may be roasted in hot ashes, instead of being boiled.

CHAP. XVIII.—FIXED OILS.

THESE oils are commonly denominated expressed oils, an appellation which is manifestly improper, as, in some instances, they are obtained without expression, and, in others, expression is employed to obtain volatile oils. The Edinburgh college have therefore distinguished these different classes of oils by the terms Fixed and Volatile, which accurately characterise them.

Fixed oil is formed in no other part of vegetables than in their fruit. Sometimes, although very rarely, it is contained in the parenchyma of the fruit. Of this the best known example is the olive. But it is most commonly found in the seeds of dicotyledonous vegetables, sometimes also in the fruit of monocotyledonous plants, as the cocos butyracea. It has various degrees of consistency, from the tallow of the croton sebiferum of China, and the butter of the butter-tree of Africa, to the fluidity of olive oil.

Fixed oils are either

1. Fat, easily congealed, and not inflammable by nitric acid, oil of olives, almonds, rapeseed, and ben.
2. Drying, not congealable, inflammable by nitric acid, oil of linseed, nut, and poppy.
3. Concrete oil, palm oil, &c.

Fixed oil is separated from the fruits and seeds which contain it, either by expression or decoction. Heat, by rendering the oil more limpid, increases very much the quantity obtained by expression; but as it renders it less bland, and more apt to become rancid, heat is not used in the preparation of oils which are to be employed in medicine. When obtained by expression, oils often contain a mixture of mucilage, starch, and colouring matter; but part of these separate in course of time, and fall to the bottom. When oils become rancid, they are no longer fit for internal use, but are then said to effect the killing of quicksilver, as it is called, more quickly. Decoction is principally used for the extraction of the viscid and consistent oils, which are melted out by the heat of the boiling water, and rise to its surface.

Those who prepare large quantities of the oil of almonds, blanch them, by steeping them in very hot water, which causes their epidermis to swell and separate easily. After peeling them, they dry them in a stove, then grind them in a mill like a coffee-mill, and, lastly, express the oil from the paste, inclosed in a hempen bag. By blanching the almonds, the paste which remains within the bag is sold with greater advantage to the perfumers, and the oil obtained is perfectly colourless. But the heat employed disposes the oil to become rancid, and the colour the oil acquires from the epidermis does not injure its qualities. For pharmaceutical use, therefore, the almonds should not be blanched, but merely rubbed in a piece of coarse linen, to separate, as much as possible, the brown powder adhering to the epidermis. Sixteen ounces of sweet almonds commonly give five ounces and a half of oil. Bitter almonds afford the same proportion, but the oil has a pleasant bitter taste.

OLEUM AMYGDALÆ COMMUNIS. *Ed.*
Oil of Almonds.

Take of
Fresh almonds, any quantity.
After having bruised them in a stone mortar, put them into a hempen bag, and express the oil, without heat.
In the same manner prepare from the seeds.

OLEUM LINI USITATISSIMI. *Edin.*
Oil of Linseed.

OLEUM AMYGDALARUM. *Dub.*
Oil of Almonds.

Bruise fresh almonds in a mortar, and express the oil in a press, without heat.

OLEUM LINI. *Dub.*
Oil of Linseed.

Is expressed in the same way from the seeds.

OLEUM AMYGDALÆ. *Lond.*
Oil of Almonds.

Macerate almonds, either sweet or bitter, in cold water, and bruise them. Then express the oil, without heat.

OLEUM LINI *Lond.*
Oil of Linseed.

Bruise the seeds of common flax, and express the oil, without heat.

OLEUM RICINI. *Lond.*
Castor Oil.

Bruise the peeled seeds, and express, without heat.

THE chemical properties of these oils have been already mentioned; and an account of the medical virtues of each will be found in their respective places in the Materia Medica.

CHAP. XIX.—OILY PREPARATIONS.

OLEUM AMMONIATUM, vulgo LINIMENTUM VOLATILE. *Ed.* LINIMENTUM AMMONIÆ. *Dub.*
Ammoniated Oil, commonly called *Volatile Liniment. Liniment of Ammonia.*

Take of
Olive oil, two ounces;
Water of ammonia, two drachms.
Mix them together.

LINIMENTUM AMMONIÆ FORTIUS. *Lond.*
Stronger Liniment of Ammonia.

Take of
Water of pure ammonia, one fluidounce;
Olive oil, two fluidounces.
Shake them together until they mix.

LINIMENTUM AMMONIA CARBONATIS. *Lond.*
Liniment of Ammonia.

Take of
Solution of carbonate of ammonia, a fluidounce;
Olive oil, three fluidounces.
Shake them together till they are mixed.

THE most commonly adopted generic name for the combination of oil with alkalies is Soap, and the species are distinguished by the addition of the name of the alkali they contain. On these principles, volatile liniment should be called Soap of Ammonia, as hard soap is soap of soda, and soft soap, soap of potass.

The ammonia used in the two first of these preparations, combines much more easily and intimately with the oil than the carbonate of ammonia used in the last. If the carbonate be employed with the view of rendering the preparation less stimulating, the same end will be more scientifically obtained, by increasing the proportion of oil mixed with pure ammonia. The two first of these liniments differ greatly in point of strength, the proportion of water of ammonia in the first being as 1 to 8, and in the second as 1 to 2.

Medical use.—They are frequently used externally as stimulants and rubefacients. In inflammatory sore throats, a piece of flannel moistened with these soaps, applied to the throat, and renewed every four or five hours, is one of the most efficacious remedies. By means of this warm stimulating application, the neck, and sometimes the whole body, is put into a sweat, which, after bleeding, either carries off or lessens the inflammation. When too strong, or too liberally applied, they sometimes occasion inflammations, and even excite blisters. Where the skin cannot bear their acrimony, a larger proportion of oil may be used.

But the first of these preparations is even sometimes used internally, made into a mixture with syrup and some aromatic water. A drachm or two taken in this manner, three or four times a-day, is a powerful remedy in some kinds of catarrh and sore throat.

LINIMENTUM AQUÆ CALCIS, SIVE OLEUM LINI CUM CALCE. *Ed.*

LINIMENTUM CALCIS. *Dub.*

Liniment of Lime Water, or *Linseed Oil with Lime.*

Take of
Linseed oil (olive oil, *Dub.*),
Lime water, of each equal parts (three ounces, by measure, *Dub.*)
Mix them (by shaking them together, *Dub.*)

THIS liniment is extremely useful in cases of scalds or burns, being singularly efficacious in preventing, if applied in time, the inflammation subsequent to these; or even in removing it, after it has come on.

It is also a species of soap, and might be called Soap of Lime, although it probably contains a great excess of oil.

OLEUM CAMPHORATUM. *Ed. Dub.*

Camphorated Oil.

Take of
Olive oil, two ounces, (by measure, *Dub.*);

Camphor, half an ounce.
Mix them, so that the camphor may be dissolved, (triturate them together, *Dub.*).

THIS is a simple solution of camphor in fixed oil, and is an excellent application to local pains, from whatever cause, and to glandular swellings.

OLEUM SULPHURATUM. *Ed.*

Sulphurated Oil.

Take of
Olive oil, eight ounces;
Sublimed sulphur, one ounce.
Boil them together in a large iron pot, stirring them continually, till they unite.

Lond.

Take of
Washed sulphur, four ounces;
Olive oil, a pint.
Gradually project the sulphur upon the oil, heated in a very large iron vessel, and stir constantly with a wooden spatula, till they unite.

GÖTTLING directs the oil to be heated in an iron pot, and the sulphur to be gradually added, while the solution is promoted by constant stirring with an iron spatula. The pot must be sufficiently large, as the mixture swells and boils up very much; and as it is apt to catch fire, a lid should be at hand to extinguish it by covering up the pot.

Medical use.—Sulphuretted oil was formerly strongly recommended in coughs, consumptions, and other disorders of the breast and lungs: but the reputation which it had in these cases, does not appear to have been derived from any fair trial or experience. It is manifestly hot, acrimonious, and irritating, and should therefore be used with the utmost caution. It has frequently been found to injure the appetite, offend the stomach and viscera, parch the body, and occasion thirst and febrile heats. The dose of it is from ten to forty drops. It is employed externally for cleansing and healing foul running ulcers; and Boerhaave conjectures, that from its effects in these cases, the virtues ascribed to it, when taken internally, were deduced, by a false analogy.

CHAP. XX.—VOLATILE OILS.

SUBSTANCES which differ in volatility, may be separated from each other by applying a degree of heat capable of converting the most volatile into vapour, and by again condensing this vapour in a proper apparatus. Water is converted into vapour at 212°, and may be separated by distillation from the earthy and saline matters which it always contains in a natural state. But, it is evident, that if any substances which are as volatile as water, be exposed to the same degree of heat, either by immersing them in boiling water, or exposing them to the action of its steam, they will rise with it in distillation. In this way the camphor and volatile oils of vegetable substances are separated from the more fixed principles.

Volatile oils are obtained only from odoriferous substances; but not equally from all of this class, nor in quantity proportional to their degree of odour. Some, which, if we were to reason from analogy, should seem very well fitted for this process, yield extremely little oil, and others none at all. Roses and chamomile flowers, whose strong and lasting smell promises abundance, are found to contain but a small quantity of oil: the violet and jessamine flower, which perfume the air with their odour, lose their smell upon the gentlest coction, and do not afford any oil on being distilled, unless immense quantities are submitted to the operation at once; while savin, whose disagreeable scent extends to no great distance, gives out the largest proportion of volatile oil of almost any vegetable known.

Nor is the same plant equally fit for this operation, when produced in different soils or seasons, or at different times of their growth. Some yield more oil if gathered when the flowers begin to fall off than at any other time. Of this we have examples in lavender and rue; others, as sage, afford the largest quantity when young, before they have sent forth any flowers; and others, as thyme, when the flowers have just appeared. All fragrant herbs yield a larger proportion of oil, when produced in dry soils, and in warm summers, than in opposite circumstances. On the other hand, some of the disagreeable strong-scented plants, as wormwood, are said to contain most oil in rainy seasons, and when growing in moist rich grounds.

Several chemists have been of opinion, that herbs and flowers, moderately dried, yield a greater quantity of volatile oil, than if they were distilled when fresh. It is, however, highly improbable, that the quantity of volatile oil will be increased by drying; on the contrary, part of it must be dissipated and lost. But drying may sometimes be useful in other ways, either by diminishing the bulk of the subject to be distilled, or by causing it to part with its oil more easily.

The choice of proper instruments is of great consequence for the performance of this process to advantage. There are some oils which pass freely over the swan-neck of the head of the common still: others less, volatile, cannot easily be made to rise so high. For obtaining these last, we would recommend a large low head, having a rim or hollow canal round it: in this canal, the oil is detained in its first ascent, and thence conveyed at once into the receiver, the advantages of which are sufficiently obvious.

We cannot separate the volatile oil from aromatic substances by distilling them alone, because the proportion of these oils is so small, that they could not be collected; and besides, it would be impossible to regulate the heat so as to be sufficient, and yet not to burn the subject, and destroy the product. Hence it is necessary to distil them with a proportion of water, which answers extremely well, as the oils are all more volatile in water, and soluble in it only to a certain extent.

With regard to the proportion of water to be employed; if whole plants, moderately dried, are used, or the shavings of woods, as much of either may be put into the vessel as, lightly pressed, will occupy half its cavity; and as much water may be added as will fill two-thirds of it. When fresh and juicy herbs are to be distilled, thrice their weight of water will be fully sufficient; but dry ones require a much larger quantity. In general, there should be so much water, that after all intended to be distilled has come over, there may be liquor enough left to prevent the matter from burning to the still. The water and ingredients, altogether, should never take up more than three-fourths of the still; there should be liquor enough to prevent any danger of empyreuma, but not so much as to be apt to boil over into the receiver.

The subject of distillation should be macerated in the water until it be perfectly penetrated by it. To promote this effect, woods should be thinly shaved across the grain, or sawn, roots cut transversely into thin slices, barks reduced into coarse powder, and seeds slightly bruised. Very compact and tenacious substances require the maceration to be continued a week or two, or longer; for those of a softer and looser texture, two or three days are sufficient, while some tender herbs and flowers not only stand in no need of maceration, but are even injured by it.

The fermentation which was formerly prescribed in some instances, is always hurtful.

The fire ought to be quickly raised, and kept up during the whole process; but to such a degree only, that the oil may freely distil; otherwise the oil will be exposed to an unnecessary heat; a circumstance which ought, as much as possible, to be avoided. Fire communicates to all these oils a disagreeable impregnation, as is evident from their being much less grateful when newly distilled, than after they have stood for some time in a cool place; and the longer the heat is continued, the greater alteration it produces in them.

The greater number of oils require for their distillation the heat of water strongly boiling; but there are many also which rise with a heat considerably less; such as those of lemon and citron peel, of the flowers of lavender and rosemary, and of almost all the more odoriferous kinds of flowers. We have already observed, that these flowers have their fragrance much injured, or even destroyed, by beating and bruising them; it is impaired also by the immersion in water in the present process, and the more so in proportion to the continuance of the immersion and the heat; hence oils, distilled in the common manner, prove mush less agreeable in smell than the subjects themselves. For the distillation of substances of this class, another method has been contrived: instead of being immersed in water, they are exposed only to its vapour. A proper quantity of water being put into the bottom of the still, the odoriferous herbs or flowers are laid lightly in a basket, of such a size that it may enter into the still, and rest against its sides, just above the water. The head being then fitted on, and the water made to boil, the steam, percolating through the subject, imbibes the oil, without impairing its fragrance, and carries it over into the receiver. Oils thus obtained, possess the odour of the subject in an exquisite degree, and have nothing of the disagreeable scent perceivable in those distilled by boiling them in water in the common manner.

Plants differ so much, according to the soil and season of which they are the produce, and likewise according to their own ages, that it is impossible to fix the quantity of water to be drawn from a certain weight of them to any invariable standard. The distillation may always be continued as long as the liquor runs well flavoured off the subject, but no longer.

The mixture of water and oil which comes over, may either be separated immediately, by means of a separatory, or after it has been put into large narrow-necked bottles, and placed in a cool place, that the portion of oil which is not dissolved in the water may rise to the top, or sink to the bottom, according to its specific gravity. It is then to be separated, either by a separatory, (Plate 1, fig. 10); or by means of a small glass syrenge; or by means of a filter of paper; or, lastly, by means of a woollen thread, one end of which is immersed in the oil, and the other lower end in a phial: the oil will thus pass over into the phial by capillary attraction; and the thread is to be squeezed dry.

The water employed in the distillation of volatile oils always imbibes some portion of the oil, as is evident from the smell, taste, and colour, which it acquires. It cannot, however, retain above a certain quantity; and, hence, such as has been already used, and, therefore, almost saturated, may be advantageously employed, instead of common water, in a second, third, or any future distillation of the same subject.

After the distillation of one oil, particular care should be had to clean the worm perfectly before it be employed in the distillation of a different substance. Some oils, those of wormwood and aniseeds for instance, adhere to it so tenaciously, as not to be melted out by heat, or washed off by water: the best way of removing these, is to run a little of spirit of wine through it.

Volatile oils, after they are distilled, should be suffered to stand for some days, in vessels loosely covered with paper, till they have lost their disagreeable fiery odour, and become limpid: then put them up in small bottles, which are to be kept quite full, closely stopped, in a cool place. With these cautions, they will retain their virtues in perfection for many years.

Most of the oils mentioned above are prepared by our chemists in Britain, and are easily procurable in a tolerable degree of perfection: but the oils from the more expensive spices, though still introduced among the preparations in the foreign pharmacopœias, are, when employed among us, usually imported from abroad.

These are frequently so much adulterated, that it is not easy to meet with such as are at all fit for use: nor are these adulterations easily disoverable. The grosser abuses, indeed, may be readily detected. Thus, if the oil be mixed with alcohol, it will turn milky on the addition of water; if with expressed oils, alcohol will dissolve the volatile, and leave the other behind: if with oil of turpentine, on dipping a piece of paper in the mixture, and drying it with a gentle heat, the turpentine will be betrayed by its smell. But the more subtile artists have contrived other methods of sophistication, which elude all trials of this kind.

Some have looked upon the specific gravity of oils as a certain criterion of their genuineness. This, however, is not to be absolutely depended on; for the genuine oils, obtained from the same subjects, often differ in gravity as much as those drawn from different ones. Cinnamon and cloves, whose oils usually sink in water, yield, if slowly and carefully distilled, oils of great fragrancy, which are specifically lighter than the aequeous fluid employed in their distillation; whilst, on the other hand, the last runnings of some of the lighter oils prove sometimes so ponderous as to sink in water.

As all volatile oils agree in the general properties of solubility in spirit of wine, indissolubility in water, miscibility with water, by the intervention of certain intermedia, volatility in the heat of boiling water, &c. it is plain that they may be variously mixed with each other, or the dearer sophisticated with the cheaper, without any possibility of discovering the abuse by any trials of this kind: and, indeed, it would not be of much advantage to the purchaser, if he had infallible criteria of the genuineness of every individual oil. It is of as much importance that they be *good*, as that they be *genuine;* for genuine oils, from inattentive distillation, and long and careless keeping, are often weaker, both in smell and taste, than the common sophisticated ones.

The smell and taste seem to be the only certain test of which the nature of the thing will admit. If a bark should have in every respect the appearance of good cinnamon, and should be proved indisputably to be the genuine bark of the cinnamon tree; yet if it want the cinnamon flavour, or has it but in a low degree, we reject it; and the case is the same with the oil. It is only from use and habit, or comparisons with specimens of known quality, that we can judge of the goodness, either of the drugs themselves or of their oils.

Most of the volatile oils, indeed, are too hot and pungent to be tasted with safety; and the smell of the subject is so much concentrated in them, that a small variation in this respect is not easily distinguished; but we can readily dilute them to any assignable degree. A drop of the oil may be dissolved in spirit of wine, or received on a bit of sugar, and dissolved by that intermedium in water. The quantity of liquor which it thus impregnates with its flavour, or the degree of flavour which it communicates to a certain determinate quantity of liquor, will be the measure of the degree of goodness of the oil.

OLEA VOLATILIA. *Ed.*

Volatile Oils.

VOLATILE OILS are prepared nearly in the same manner as the distilled waters, except that less water is to be added. Seeds and woody substances are to be previously bruised or rasped. The oil comes over with the water, and is afterwards to be separated from it, according as it may be lighter than the water, and swim upon its surface, or heavier, and sink to the bottom.

Besides, in preparing these distilled waters and oils, it is to be observed, that the goodness of the subject, its texture, the season of the year, and similar causes, must give rise to so many differences, that no certain or general rule can be given to suit accurately each example. Therefore many things are omitted, to be varied by the operator according to his judgment, and only the most general precepts are given.

OLEA DISTILLATA. *Lond.*
Distilled Oils.

The seeds of anise and carraway, the flowers of chamomile and lavender, the berries of juniper and allspice, the tops of rosemary, and the dried herbs of other articles are to be used.

Each of these is to be put into an alembic, and covered with water, and the oil drawn off by distillation into a large refrigeratory.

The water which comes over with the oil of caraway, peppermint, mint, allspice, and pennyroyal, in distallation, is to be kept for use.

Dub.

Let the oil be extracted, by distillation, from the subject previously macerated in water, with the addition of as much water as may be sufficient to prevent empyreuma.

In distilling fennel, peppermint, spearmint, pennyroyal, and pimento, the liquor which comes over along with the oil is to be preserved for use in the manner directed in the chapter on Distilled Waters.

According to these directions, prepare

OLEUM VOLATILE. *Ed.* DISTILLATUM. *Dub. Lond.*	Volatile, or distilled oil of
Semimum CARUI. *Dub. Lond.*	Caraway.
Seminum FOENICULI DULCIS. *Dub.*	Fennel seed.
Baccarum JUNIPERI COMMUNIS. *Ed.*	Juniper berries.
JUNIPERI. *Lond. Dub.*	
Foliorum JUNIPERI SABINÆ. *Ed.*	Savine.
SABINÆ. *Dub.*	
Radicis LAURI SASSAFRAS. *Ed.*	Sassafras.
Corticis et Ligni SASSAFRAS. *Dub.*	
Spicarum florentium LAVANDULÆ SPICÆ. *Ed.*	Lavender.
Florum LAVANDULÆ. *Lond. Dub.*	
Florum ANTHEMIDIS. *Lond.*	Chamomile.

Herbæ florescentis MENTHÆ PIPERITÆ. *Ed. Lond.*	Peppermint.
Herbæ florescentis MENTHÆ PIPERITIDIS. *Dub.*	
Herbæ florescentis MENTHÆ SATIVÆ. *Dub.*	Spearmint.
MENTHÆ VIRIDIS. *Lond.*	
Fructus MYRTI PIMENTÆ. *Ed.*	Pimento.
Baccarum PIMENTO. *Dub.* PIMENTA. *Lond.*	
Herbæ florescentis ORIGANI. *Dub.*	Origanum.
Seminum PIMPINELLÆ ANISI. *Ed.*	Aniseed.
——— ANISI. *Lond. Dub.*	
Herbæ florescentis PULEGII. *Lond. Dub.*	Pennyroyal.
Summitatum Florescentium RORISMARINI OFFICINALIS. *Ed.*	Rosemary.
Herbæ florescentis RORISMARINI. *Dub.* ROSMARINI. *Lon.*	
Herbæ florescentis RUTÆ. *Dub.*	

Medical use.—Volatile oils, medicinally considered, agree in the general qualities of pungency and heat; in particular virtues, they differ as much as the subjects from which they are obtained, the oil being the direct principle in which the virtues, or at least a considerable part of the virtues, of the several subjects reside. Thus, the carminative virtue of the warm seeds, the diuretic of juniper berries, the emenagogue of savine, the nervine of rosemary, the stomachic of mint, the antiscorbutic of scurvy-grass, the cordial of aromatics, &c. are supposed to be concentrated in their oils.

There is another remarkable difference in volatile oils, the foundation of which is less obvious, that of the degree of their pungency and heat. These are by no means in proportion, as might be expected, to those of the subject they were drawn from. The oil of cinnamon, for instance, is excessively pungent and fiery; in its undilluted state it is almost caustic; whereas cloves, a spice which, in substance, is far more pungent than the other, yields an oil which is much less so. This difference seems to depend partly upon the quantity of oil afforded, cinnamon yielding much less than cloves, and, consequently, having its active matter concentrated into a smaller volume; partly upon a difference in the nature of the active parts themselves; for though volatile oils contain always the specific odour and flavour of their subjects, whether grateful or ungrateful, they do not always contain the whole pungency: this resides frequently in a more fixed matter, and does not rise with the oil. After the distillation of cloves, pepper, and some other spices, a part of their pungency is found to remain behind; a simple tincture of them in alcohol is even more pungent than their pure essential oils.

The more grateful oils are frequntly made use of for reconciling to the stomach medicines of themselves disgustful. It has been customary to employ them as correctors for the resinous purgatives; an use to which they do not seem to be well adapted. All the service they can here be of is, to make the resin sit more easily at first on the stomach; far from abating the irritating quality upon which the violence of its operation depends, these pungent oils superadd a fresh stimulus.

Volatile oils are never given alone, on account of their extreme heat and pungency; which in some is so great, that a single drop let fall upon the tongue produces a gangrenous eschar. They are readily imbibed by pure dry sugar, and in this form may be conveniently exhibited. Ground with eight or ten times their weight of sugar, they become soluble in aqueous liquors, and thus may be diluted to any assigned degree. Mucilages also render them miscible with water into an uniform milky liquor. They dissolve likewise in alcohol; the more fragrant in an equal weight, and almost all of them in less than four times their own quantity. These solutions may be either taken on sugar, or mixed with syrups, or the like. On mixing them with water, the liquor grows milky, and the oil separates.

The more pungent oils are employed externally against paralytic complaints, numbness, pains, and aches, cold tumours, and in other cases where particular parts require to be heated or stimulated. The toothach is sometimes relieved by a drop of these almost caustic oils, received on cotton, and cautiously introduced into the hollow tooth.

OLEUM TEREBINTHINÆ. *Dub.*

Oil of Turpentine.

Take of
Common turpentine, five pounds;
Water, four pints.

Distil the turpentine with the water in a copper alembic. After the distillation of the oil, what remains in the retort is *yellow resin.*

OLEUM VOLATILE PINI PURISSIMUM; olim OLEUM TEREBINTHINÆ PURISSIMUM. *Ed.* OLEUM TEREBINTHINÆ RECTIFICATUM. *Lond. Dub.*

Rectified Oil of Turpentine.

Take of
Oil of turpentine, one pint, (two pints, *Dub.*);
Water, four pints, (four pints, *Dub.*)

Distil, *Lond.* (a pint and a half of oil, *Dub.*) (as long as any oil comes over, *Ed.*)

This rectified oil, which, in many pharmacopœias, is styled Ethereal, is said not to have its specific gravity, smell, taste, or medical qualities, much improved by this process, which is both tedious and accompanied with danger. It must be conducted with very great care; for the vapour which is apt to escape through the junctures of the vessels, is very inflammable.

Medical use.—The spirit of turpentine, as this essential oil has been styled, is frequently taken internally as a diuretic and sudorific; and it has sometimes a considerable effect when taken to the extent of a few drops only. It has, however, been given in much larger doses, especially when mixed with honey. Recourse has principally been had to such doses in cases of chronic rheumatism, particularly in those modifications of it which are termed sciatica and lumbago; but sometimes they induce bloody urine.

Oil of turpentine, melted with as much ointment of yellow resin as is sufficient to give it the consistence of a liniment, constitutes the application to recent burns so strongly recommended by Mr. Kentish. He first bathes the part with heated oil of turpentine, alcohol, or tincture of camphor, and then covers it up with rags dipped in the liniment, which are to be renewed one at a time, once a day. As the inflammation subsides, less stimulating applications are to be used; and when the secretion of pus commences, the parts are then to be covered with powdered chalk, heated to the temperature of the body. In this way, he assures us that he cured very many extensive burns in a few weeks, which, under the use of cooling applications, would have required as many months, or would have been altogether incurable.

CHAP. XXI.—DISTILLED WATERS.

In the distillation of volatile oils, the water, as was observed in a foregoing section, imbibes always a part of the oil. The distilled liquors here treated of, are no other than water thus impregnated with the essential oil of the subject; whatever smell, taste, or virtue, is communicated to the water, or obtained in the form of watery liquor, being found in a concentrated state in the oil.

All those vegetables, therefore, which contain an essential oil, will give over some virtue to water by distillation: but the degree of the impregnation of the water, or the quantity of water which a plant is capable of saturating with its virtue, are by no means in proportion to the quantity of its oil. The oil saturates only the water that comes over at the same time with it: if there be more oil than is sufficient for this saturation, the surplus separates, and concretes in its proper form, not miscible with the water that arises afterwards. Some odoriferous flowers, whose oil is in so small quantity, that scarcely any visible mark of it appears, unless fifty or an hundred pounds or more are distilled at once, give nevertheless as strong an impregnation to water as those plants which abound most with oil.

Many have been of opinion, that distilled waters may be more and more impregnated with the virtues of the subject, and their strength increased to any assigned degree, by *cohobation*, that is, by re-distilling them repeatedly from fresh parcels of the plant. Experience, however, shews the contrary. A water skilfully drawn in the first distillation, proves, on every repeated one, not stronger, but more disagreeable. Aqueous liquors are not capable of imbibing above a certain quantity of the volatile oil of vegetables; and this they may be made to take up by one, as well as by any number of distillations: the oftener the process is repeated, the ungrateful impression which they generally receive from the fire, even at the first time, becomes greater and greater.

Those plants, which do not yield at first waters sufficiently strong, are not proper subjects for this process.

Most distilled waters, when first prepared, have a somewhat unpleasant smell, which, however, they gradually lose: it is therefore advisable to keep them for some days after their preparation in vessels but slightly covered; and not to cork them up until they lose that smell.

That the waters may keep the better, about one-twentieth part their weight of proof spirit may be added to each after they are distilled. I have been informed by a respectable apothecary, that if the simple distilled waters be rectified by distilling them a second time, they will keep for several years without the addition of any spirit, which always gives an unpleasant flavour, and is often objectionable for other reasons.

Distilled waters are employed chiefly as grateful diluents, as suitable vehicles for medicines of greater efficacy, or for rendering disgustful ones more acceptable to the palate and stomach: few of them are depended on, with any intention of consequence, by themselves.

To the chapter on Simple Distilled Waters, the London college have annexed the following remarks.

> The waters are to be distilled from the dried herbs, unless otherwise ordered, because they are not to be had at all times of the year. Whenever fresh vegetables are used, the weights are to be doubled.

To every gallon of these waters add five fluidounces of proof spirit, to preserve them.

The Edinburgh and Dublin colleges order half an ounce of proof spirit to every pound of the water, which is nearly the same proportion.

AQUA DISTILLATA. *Lond.*
Distilled Water.

Take of

Spring water, ten gallons.

Draw off by distillation, first, four pints; which being thrown away, draw off four gallons. This water is to be kept in a glass bottle.

Dub.

Take of

Spring water, twenty pints.

Put it into a glass retort, and having thrown away the first pint which comes over, draw off one gallon by distillation with a gentle heat.

Edin.

Let water be distilled in very clean vessels, until about two-thirds have come over.

WATER is never found pure in a state of nature; and as it is absolutely necessary, particularly for many chemical operations, that it should be perfectly so, we must separate it from all heterogeneous matters by distillation. The first portion that comes over should be thrown away, not so much from the possibility of its being impregnated with volatile matters contained in the water, as from the probability that it will be contaminated with impurities it may have contracted in its passage through the worm in the refrigeratory. The distillation is not to be pushed too far, lest the water should acquire an empyreumatic flavour.

Although distilled water be necessary for many purposes, we apprehend that the London college, from a desire of extreme elegance, in their former edition, fell into a very considerable error, in ordering it to be employed for many purposes, such as infusions and decoctions, for which good spring water answered just as well, and for which, we will venture to say, that it never is employed by the apothecary. The consequence was, that the apothecary having no rule to direct him, when it is absolutely necessary, and when it might be dispensed with, dispensed with it oftener than was proper. In the present edition they have taken care not to subject themselves to this criticism.

AQUA CITRI AURANTII. *Ed.*

Orange-peel Water.

Take of
Fresh orange-peel, two pounds.

Pour upon it as much water as shall be sufficient to prevent any empyreuma, after ten pounds have been drawn off by distillation. After due maceration, distil ten pounds.

AQUA FOENICULI. *Lond.* AQUA FOENICULI DULCIS. *Dub.*

Fennel Water.

Take of
The bruised seeds of sweet fennel, one pound.
Water, as much as may be sufficient to prevent empyreuma,
Distil one gallon.

IN the same manner, and in the same quantity, prepare

Aqua.	Water of
Anethi. *Lond.*	Dil, *from one pound bruised.*
Carui. *Lond.*	Carraway, *from one pound bruised.*
Citri Aurantii. *Ed.*	Orange-peel, *from two pounds fresh.*
Citri Medicæ. *Ed.*	Lemon-peel, *from two pounds fresh.*
Foeniculi. *Lond. Dub.*	Fennel, *from bruised seeds, one pound.*
Lauri Cassiæ. *Ed.*	Cassia, *from one pound of the bark bruised.*
Lauri Cinnamomi. *Ed.* Cinnamomi. *Lond. Dub.*	Cinnamon, *from one pound bruised and macerated for a day in a pint of water.*
Menthæ Piperitæ. *Ed. L.*	Peppermint, *from three pounds.*
Menthæ Piperitidis. *D.*	———— *from one and a half.*
Menthæ Pulegii. *Ed.*	Pennyroyal, *three pounds.*
Pulegii. *Lond. Dub.*	———— *one and a half.*
Menthæ Sativæ. *Dub.* Viridis. *Lond.*	Spearmint, *one and a half.*
Myrti Pimentæ. *Ed.* Pimento. *Dub.* Pimentæ. *Lond.*	Pimento, *half a pound bruised, and macerated for a day in a pint of water.*
Rosæ Centifoliæ. *Ed.* Rosæ. *Lond. Dub.*	Rose, *from six pounds recent petals.*

The virtues of all these waters are nearly alike; and the peculiarities of each will be easily understood, by consulting the account given in the Materia medica of the substance from which they are prepared. Mr. Nicholson mentions, that as rose-water is exceedingly apt to spoil, the apothecaries generally prepare it in small quantities at a time from the leaves, preserved by packing them closely in cans with common salt. This, we understand, is not the practice in Edinburgh; and, indeed, cannot succeed with the petals of the damask rose; for they lose their smell by drying. The London apothecaries, therefore, probably use the red rose. The spoiling of some waters is owing to some mucilage carried over in the distillation; for, if rectified by a second distillation, they keep perfectly well for any length of time.

CHAP. XXII.

EMPYREUMATIC VOLATILE OILS.

EMPYREUMATIC OILS agree in many particulars with the volatile oils already treated of, but they also differ from them in several important circumstances. The latter exist ready formed in the aromatic substances from which they are obtained, and are only separated from the fixed principles by the action of a heat not exceeding that of boiling water. The former, on the contrary, are always formed by the action of a degree of heat considerably higher than that of boiling water, and are the product of decomposition, and a new arrangement of the elementary principles of substances, containing at least oxygen, hydrogen, and carbon. Their production is therefore always attended with the formation of other new products. In their chemical properties they do not differ very remarkably from the volatile oils, and are principally distinguished from them by their unpleasent pungent empyreumatic smell, and rough bitterish taste. They are also more apt to spoil by the contact of the air, and the oftener they are re-distilled, they become more limpid, less coloured, and more soluble in alcohol; whereas the essential oils, by repeated distillations, become thicker and less soluble in alcohol.

Their action on the body is exceedingly stimulant and heating.

OLEUM SUCCINI PURISSIMUM. *Ed.*
Purified Oil of Amber.

Distil oil of amber in a glass retort, with six times its quantity of water, till two thirds of the water have passed into the receiver; then separate this very pure volatile oil from the water, and preserve it in close shut vessels.

OLEUM SUCCINI. *Lond.*
Oil of Amber.

Put amber into an alembic, and distil from it, in a sand-bath, with a gradually increased heat, an acid liquor, oil and salt impregnated with oil. Then re-distil the oil twice.

Dub.

Take of
The oil which rises in the preparation of succinic acid, one pound;
Water, six pints;
Distil until two-thirds of the water have come over; then separate the oil.

The rectified oil has a strong bituminous smell, and a pungent acrid taste. Given in a dose of ten or twelve drops, it heats, stimulates and promotes the fluid secretions; it is chiefly celebrated in hysterical disorders, and in deficiences of the uterine purgations. Sometimes it is used externally, in liniments, for weak or paralytic limbs, and rheumatic pains

MOSCHUS ARTIFICIALIS.
Artificial Musk.

By treating one part of oil of amber with four of nitrous acid, added in small portions at a time, and stirring them together with a glass rod, the oil is at last converted into a yellow resin, having the smell of musk, and known in Germany by the name of Artificial musk, where it is often used as a substitute for that expensive drug.

OLEUM CORNU CORVINI RECTIFICATUM. *Dub.*
Rectified Oil of Hartshorn.

Take of
The oil which ascends in the distillation of the volatile liquor of hartshorn, three pounds;
Water, six pints.
Distil the oil, and re-distil it with water, until it becomes limpid. It ought to be kept in a dark place, and in small phials, completely filled and well corked.

ANIMAL OIL, thus rectified, is thin and limpid, of a subtle, penetrating, not disagreeable, smell and taste.

Medical use.—It is strongly recommended as an anodyne and antispasmodic, in doses of from 15 to 30 drops. Hoffman reports, that it procures a calm and sweet sleep, which continues often for 20 hours, without being followed by any languor or debility, but rather leaving the patient more alert and cheerful than before: that it procures likewise a gentle sweat, without increasing the heat of the blood: that, given to twenty drops or more, on an empty stomach, six hours before the accession of an intermittent fever, it frequently removes the disorder: and that it is likewise a very general remedy in inveterate and chronical epilepsies, and in convulsive motions, especially if given before the usual time of the attack, and preceded by proper evacuations. How far empyreumatic oils possess the virtues that have been ascribed to them, has not yet been sufficiently determined by experience, their tedious and troublesome rectification having prevented their coming into general use, or being often prepared. They are liable also to more material inconvenience in regard to their medicinal use, namely, precariousness in their quality; for how perfectly soever they may be rectified, they gradually lose, on keeping, the qualities they had received from that process, and return more and more towards their original fetid state.

CHAP. XXIII.—DISTILLED SPIRITS.

THE flavour and virtues of distilled waters are owing, as observed in the preceding chapter, to their being impregnated with a portion of the volatile oil of the subject from which they are drawn. Alcohol, considered as a vehicle for these oils, has this advantage above water, that it keeps all the oil that rises with it perfectly dissolved into an uniform limpid liquor.

Nevertheless, many substances, which, on being distilled with water, impart to it their virtues in great perfection, if treated in the same manner with alcohol, scarcely give over to it any smell or taste. The cause of this difference is, that alcohol is not susceptible of so great a degree of heat as water. It is obvious, therefore, that some substances may be volatile enough to rise with the heat of boiling water, but not with that of boiling alcohol.

Thus, if cinnamon, for instance, be committed to distillation with a mixture of alcohol and water, or with proof spirit, which is no other than a mixture of about equal parts of the two, the alcohol will arise first, clear, colourless, and transparent, and almost without any taste of the spice; but, as soon as the more ponderous watery fluid begins to arise, the oil comes freely over with it, so as to render the liquor highly odorous, sapid, and of a milky hue.

The proof spirit usually met with in the shops is very rarely pure, or free from all unpleasant flavour, which, though concealed by means of certain additions, plainly discovers itself when employed for the preparation of distilled spirits. This nauseous flavour does not begin to arise till after the alcohol has come over, which is the very time that the virtues of the ingredients begin also to arise most plentifully; and hence the liquor receives an ungrateful taint. To this cause principally is owing the general complaint, that the cordials of the apothecary are less agreeable than those of the same kind prepared by the distiller; the latter being extremely curious in rectifying and purifying the spirits, which he uses for what he calls fine goods, from all unpleasant flavour.

SPIRITUS CARI CARUI. *Ed.*

Spirit of Caraway.

Take of
- Caraway seeds, bruised, half a pound;
- Diluted alcohol, nine pounds.

Macerate for two days in a close vessel; then pour on as much water as will prevent empyreuma, and draw off, by distillation, nine pounds.

SPIRITUS CARUI. *Lond. Dub.*

Spirit of Caraway.

Take of
- Caraway seeds, bruised, half a pound, *Dub.* (a pound and an half, *Lond.*);
- Proof spirit of wine, one gallon;
- Water, sufficient to prevent empyreuma.

Draw off one gallon. *Dub.*

Macerate for twenty-four hours, and with a slow heat; distil one gallon. *Lond.*

In this manner, prepare the same quantity of spirit from

SPIRITUS

LAURI CINNAMONI *Ed.* CINNAMONI. *Lond. Dub.*	*Cinnamon*, bruised, one pound.
MENTHÆ PIPERITÆ. *Ed. Lond.*	*Peppermint*, in flower, one pound and a half.
MENTHÆ VIRIDIS. *Lond.*	*Spearmint*, one pound and a ha

PULEGII. *Lond.*	*Pennyroyal*, dried, a pound and a half.
MYRISTICÆ. *Lond.*	*Nutmeg*, well bruised, two ounces.
MYRISTICÆ MOSCHATÆ. *Ed.*	
NUCIS MOSCHATÆ. *Dub.*	
MYRTI PIMENTÆ. *Ed.*	*Pimento*, bruised, half a pound.
PIMENTO. *Dub.*	three ounces.
PIMENTÆ. *Lond.*	two ounces.
ROSMARINI. *Lond.*	*Rosemary*, tops fresh, two pounds.
ANISI. *Lond.*	*Aniseed*, bruised, half a pound.

SPIRITUS LAVANDULÆ SPICÆ. *Ed.*

Spirit of Lavender.

Take of
Flowering spikes of lavender, two pounds;
Alcohol, eight pounds.
Draw off, in a water-bath, seven pounds.

SPIRITUS LAVANDULÆ. *Lond.*

Spirit of Lavender.

Take of
Fresh lavender flowers, two pounds;
Rectified spirit, one gallon;
Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours, with a slow fire. Draw off a gallon.

Dub.

Take of
Fresh tops of lavender, one pound and a half;
Proof spirit of wine, one gallon;
Water, sufficient to prevent empyreuma.
Draw off, by distillation in a water-bath, five pints.

BY these directions, and in the same quantity, is prepared,

SPIRITUS RORISMARINI OFFICINALIS. *Ed.*	*Rosemary*, two pounds.
SPIRITUS RORISMARINI. *Dub.*	——— a pound and a half.

We think it unnecessary to make particular observations on each of these simple spirits, as their virtues are the same with those of the substances from which they are extracted, united to the stimulus of the alcohol. The alcohol in the spirits of lavender and rosemary is almost pure; in the others, it is diluted with about an equal weight of water.

SPIRITUS ANISI COMPOSITUS. *Dub.*
Compound Spirit of Aniseed.

Take of
Aniseed,
Angelica seed, of each, bruised, half a pound ;
Proof spirit, one gallon ;
Water, sufficient to prevent empyreuma.
Draw off one gallon by distillation.

This compound spirit, like the simple ones, is an agreeable cordial ; indeed they are too agreeable, for by some they are so often resorted to, on the slightest sensation of flatulence in the stomach, that their use is attended with all the pernicious consequences of dram-drinking.

SPIRITUS JUNIPERI COMPOSITUS. *Ed. Lond. Dub.*
Compound Spirit of Juniper.

Take of
Juniper berries, well bruised, one pound ;
Caraway seeds,
Sweet fennel seeds, each, bruised, one ounce and a half ;
Diluted alcohol, nine pounds, (one gallon, *Lond. Dub.*)
Macerate for two days, (twenty-four hours, *Lond.*) ; and, having added as much water as will prevent empyreuma, draw off, by distillation, nine pounds, *Ed.* (one gallon, *Lond. Dub.*)

The good and bad effects of this spirit exactly coincide with those of gin.

SPIRITUS RAPHANI COMPOSITUS. *Dub.*
Compound Spirit of Horse-Radish.

Take of
Fresh horse-radish root,
Dried outer rind of Seville oranges, each two pounds ;
Fresh herb of garden scurvy-grass, four pounds ;
Bruised nutmegs, one ounce ;
Proof spirit, two gallons ;
Water, sufficient to prevent empyreuma.
Draw off two gallons.

SPIRITUS ARMORACIÆ COMPOSITUS. *Lond.*
Compound Spirit of Horse-Radish.

Take of
Fresh horse-radish root, sliced,
Dried orange peel, each one pound ;
Nutmegs, bruised, half an ounce ;
Proof spirit, one gallon ;
Water, sufficient to prevent empyreuma.

Macerate for twenty-four hours; and distil, with a slow ſire, one gallon.

This is an aromatic acrid spiritous liquor, but has no pretensions to the specific antiscorbutic properties formerly ascribed to it.

ALCOHOL AMMONIATUM FŒTIDUM. *Edin.*

Fetid Ammoniated Alcohol.

Take of
- Spirit of ammonia, eight ounces;
- Assa ſœtida, half an ounce;

Digest, in a close vessel, twelve hours; then distil off, with the heat of boiling water, eight ounces.

SPIRITUS AMMONIÆ FŒTIDUS, *Lond.*

Fetid Spirit of Ammonia.

Take of
- Spirit of ammonia, two pints;
- Assa fœtida, two ounces;

Macerate for twelve hours; and distil, with a slow ſire, into a cold receiver, a pint and a half.

Dub.

Take of
- Spirit of ammonia, two pints;
- Assa fœtida, an ounce and a quarter.

Digest, in a close vessel, for three days, with occasional agitation. Pour off the clear liquor, and distil a pint and a half.

Volatile spirits, impregnated with different fetids, have been usually kept in the shops, as anti-hysterics: the ingredient here chosen is the best calculated of any for general use. The spirit is pale when newly distilled, but acquires a considerable tinge by keeping.

ALCOHOL AMMONIATUM AROMATICUM. *Ed.*

Aromatic Ammoniated Alcohol.

Take of
- Ammoniated alcohol, eight ounces;
- Volatile oil of rosemary, one drachm and a half;
- Volatile oil of lemon-peel, one drachm.

Mix them, that the oils may be dissolved.

SPIRITUS AMMONIÆ AROMATICUS. *Dub.*

Aromatic Spirit of Ammonia.

Take of
- Spirit of ammonia, two pints;
- Essential oil of nutmeg, two drachms;

Nutmegs, bruised, half an ounce.
Digest, in a close vessel, for three days, with occasional agitation, and draw off a pint and a half,

Lond.

Take of
Spirit of ammonia, two pints;
Essential oil of lemon,
———————— cloves, of each, two fluiddrachms.
Mix them.

Medicines of this kind might be prepared extemporaneously, by dropping any proper volatile oil into ammoniated alcohol, which will readily dissolve the oil, if the ammonia in the solvent be caustic; for if it be carbonated, such as it was when prepared according to the former directions of the London college, it does not dissolve the oils here ordered, and is therefore totally unfit for this preparation.

Medical use—Ammonia, thus united with aromatics, is not only more agreeable in flavour, but likewise more acceptable to the stomach, and less acrimonious, than when uncombined. The dose is from five or six drops to sixty, or more.

SPIRITUS AMMONIÆ SUCCINATUS. *Lond.*

Succinated Spirit of Ammonia.

Take of
Mastiche, three drachms;
Alcohol, nine fluid drachms;
Oil of lavender, fourteen minims;
Oil of amber, four minims;
Solution of ammonia, ten fluid ounces.
Macerate the mastiche in the alcohol, until it be dissolved. Pour off the clear tincture; add the other ingredients, and mix them by shaking.

This preparation is intended as a substitute for Eau de Luce, which was formerly imported entirely from Paris. It is now, we believe, prepared also by the chemists and druggists in London, but without some peculiar manipulation, which is kept secret, the above formula does not succeed in giving the liquor that permanent milky opacity, which is deemed essential to good Eau de Luce; for it becomes more or less transparent by keeping. This fancied perfection is, however, in a medical point of view, immaterial; and, whether it be opaque or transparent, it is an excellent analeptic remedy, and may be used in the same circumstances, and in the same doses, as the spirit of ammonia itself,

CHAP. XXIV.—INFUSIONS.

We have already explained the sense in which we employ the term infusion. We confine it to the action of a menstruum, not assisted by ebullition, on any substance consisting of heterogeneous principles, some of which are soluble, and others insoluble in that menstruum. The term is generally used in a more extensive, but, we are inclined to think, a less correct, sense: thus, lime water and the mucilages, which are commonly classed with the infusions, are instances of simple solution, and the chalk mixture is the mechanical suspension of an insoluble substance. When the menstruum used is water, the solution is termed simply an infusion; but when the menstruum is alcohol, it is called a Tincture; when wine or vinegar, a Medicated Wine or Vinegar. Infusions in water are extremely apt to spoil, and are generally extemporaneous preparations.

AQUA CALCIS COMPOSITA. *Dub.*

Compound Lime Water.

Take of
  Guaiac wood, in shavings, half a pound;
  Liquorice root, sliced and bruised, an ounce;
  Sassafras bark, bruised, half an ounce;
  Coriander seeds, three drachms;
  Lime water, six pints.
Macerate, without heat, for two days, and filter.

This, though an infusion, may be considered as an equivalent for the compound decoction of guaiac, as the lime water cannot fail to be decomposed during the preparation.

AQUA PICIS LIQUIDÆ. *Dub.*

Tar Water.

Take of
  Tar, two pints;
  Water, one gallon.
Mix, by stirring them with a wooden rod, for a quarter of an hour, and, after the tar has subsided, strain the liquor, and keep it in well-corked phials.

Tar water should have the colour of white wine, and a sharp empyreumatic taste. It is, in fact, a solution of empyreumatic oil, effected by means of acetous acid. It was at one time much extolled as a panacea, but has of late been little employed. It acts as a stimulant, raising the pulse, and increasing the discharge by the skin and kidneys. It may be drunk to the extent of a pint or two in the course of a day.

INFUSUM ANTHEMIDIS. *Lond.*

Infusion of Chamomile.

Take of
Chamomile flowers, two drachms;
Boiling water, half a pint.
Macerate, for ten minutes, in a vessel loosely covered, and filter.

This is a very common extemporaneous prescription under the title of *chamomile tea* It is a good stomachic.

INFUSUM ARMORACIÆ COMPOSITUM. *Lond*

Compound Infusion of Horse-Radish.

Take of
Fresh horse-radish root, sliced,
Mustard seed, bruised, of each an ounce;
Boiling water, a pint.
Macerate for two hours, in a loosely covered vessel, and strain; then add
Compound spirit of horse-radish, a fluidounce.

This is a pungent and stimulant infusion.

INFUSUM AURANTII COMPOSITUM. *Lond.*

Compound Infusion of Orange-peel.

Take of
Orange-peel, dried, two drachms;
Lemon-peel, fresh, one drachm;
Cloves, bruised, half a drachm;
Boiling water, half a pint.
Macerate for two minutes, in a loosely covered vessel, and strain.

A stomachic infusion.

INFUSUM CALUMBÆ. *Lond.*

Infusion of Columbo

Take of
Columbo root, sliced, one drachm;
Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

A stomachic bitter.

INFUSUM CARYOPHLLORUM. *Lond.*
Infusion of Cloves.

Take of
  Cloves, bruised, one drachm;
  Boiling water, half a pint.
Macerate for two hours, in a vessel loosely covered, and strain.

An aromatic stimulant.

INFUSUM CASCARILLÆ. *Lond.*
Infusion of Cascarilla.

Take of
  Cascarilla root, bruised, half an ounce;
  Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

An aromatic stimulant

INFUSUM CINCHONÆ OFFICINALIS *Ed.*
Infusum Cinchonæ. *Lond.*
Infusion of Cinchona Bark.

Take of
  Peruvian bark, in powder, one ounce, (half an ounce, *Lond.*);
  Water, one pound, (half a pint.)
  Macerate for twenty-fours, (two hours in a loosely covered vessel, *Lond.*) and filter.

Infusum Cinchonæ sine Calore. *Dub.*
Cold Infusion of Cinchona.

Take of
  Peruvian bark, in coarse powder, one ounce;
  Water, twelve ounces, by measure.
Triturate the bark with a little of the water, and add the remainder during the trituration. Macerate for twenty-four hours, and decant the pure liquor.

This is a very elegant form of exhibiting the active principles of cinchona bark, and that in which it will sit lightest on weak and delicate stomachs. The trituration directed by the Dublin college will promote the solution. The residuum of the cold infusion may be afterwards employed in making other preparations, especially the extract, for its virtues are by no means exhausted. But it must never be dried, and sold, or exhibited in substance, for that would be a culpable fraud.

INFUSUM CUSPARIÆ. *Lond.*
Infusion of Angustura.

Take of
  Angustura bark, bruised, two drachms;

Boiling water, half a pint.
Macerate for two hours, in a loosely covered vessel, and strain.

A stimulant febrifuge.

INFUSUM DIGITALIS. *Lond.*
Infusion of Foxglove.

Take of
Foxglove leaves, dried, a drachm;
Boiling water, half a pint.
Macerate for four hours, in a loosely covered vessel, and strain; then add
Spirit of cinnamon, half a fluidounce.

INFUSUM DIGITALIS PURPUREÆ. *Ed.*
Infusion of Foxglove.

Take of
Dried leaves of foxglove, one drachm;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce.
Macerate for four hours, and filter.

This is the infusion so highly recommended by Withering. Half an ounce or an ounce, of it, may be taken twice a-day in dropsical complaints. The spirit of cinnamon is added to improve its flavour, and to counteract its sedative effects.

INFUSUM GENTIANÆ COMPOSITUM. *Ed.*
Compound Infusion of Gentian.

Take of
Gentian root, cut into pieces, half an ounce;
Dried peel of Seville oranges, bruised, one drachm;
Coriander seeds, bruised, half a drachm;
Diluted alcohol, four ounces;
Water, one pound.
First power on the alcohol, and, three hours thereafter, add the water; then macerate, without heat, for twelve hours, and strain.

Lond.

Take of
The root of gentian, sliced,
Dried orange-peel, each one drachm;
Fresh lemon-peel, two drachms;
Boiling water, twelve fluidounces.
Macerate for an hour in a loosely covered vessel, and strain.

Dub.

Take of
Bruised gentian root, two drachms;
Fresh outer rind of lemons, half an ounce;
Dried peel of Seville oranges, a drachm and a-half;
Proof spirit, four ounces by measure.
Boiling water, twelve ounces, by measure.

First pour on the spirit, and after three hours, the water. Lastly, after macerating two hours, filter.

THESE formulæ are all essentially the same. The Edinburgh college employ the largest proportion of gentian; but they infuse it in cold water, which does not extract the bitter principle so quickly or so fully as boiling water, although it dissipates less of the flavour of the aromatics. The alcohol is a useful addition, both in promoting the extraction of the virtues of all the ingredients, and in preserving the infusion longer from spoiling.

Medical use.—Gentian is the strongest and purest of the European bitters, and readily imparts its virtues to water. These infusions are in very common use as stomachic and tonic.

INFUSUM LINI. *Lond.*

Infusion of Lintseed.

Take of
Lintseed, bruised, an ounce;
Liquorice root, sliced, half an ounce;
Boiling water, two pints.

Macerate for four hours near the fire, in a loosely covered vessel, and strain.

THIS is a mucilaginous emollient liquor, much used in gonorrhœas, strangury, and in pectoral complaints.

INFUSUM MENTHÆ COMPOSITUM *Dub.*

Compound Infusion of Mint.

Take of
The leaves of spearmint, dried, two drachms;
Boiling water, as much as will afford six ounces of the infusion, when filtered.

Digest for half an hour, in a covered vesssel; strain the liquor when cold, and then add of
Double refined sugar, two drachms;
Oil of Spearmint, three drops, dissolved in
Compound tincture of cardamoms, half an ounce. Mix.

THIS infusion is slightly stimulating and diaphoretic, and forms a very agreeable herb-tea, which may be used in any quantity in diet, or as a vehicle for more active remedies.

INFUSUM MIMOSÆ CATECHU. *Ed.*

INFUSUM CATECHU. *Lond.*

Infusion of Catechu.

Take of

Extract of catechu, in powder, two drachms and a half;
Cinnamon, bruised, half a drachm;
Boiling water, seven ounces, (half a pint, *Lond.*);
(Simple syrup, one ounce, *Ed.*).

Macerate the extract and cinnamon in the water, in a covered vessel, for two hours; (one hour, *Lond.* then strain it, (and add the syrup. *Ed.*).

As this preparation will not keep above a day, or two, it must always be made extemporaneously. The long maceration, therefore, becomes very often extremely inconvenient; but it may be prepared in a few minutes, by boiling, without in the least impairing the virtue of the medicine.

Medical use.—Extract of catechu is almost pure tannin. This infusion is therefore a powerfully-astringent solution. The cinnamon and syrup render it sufficiently agreeable; and it will be found serviceable in diarrhœas proceeding from a laxity of the intestines. Its dose is a spoonful or two every other hour, or after every loose stool.

INFUSUM QUASSIÆ. *Lond.*

Infusion of Quassia.

Take of

Quassia shavings, a scruple;
Boiling water, half a pint.

Macerate for two hours, in a loosely covered vessel, and strain.

ONE of the most intense and purest bitters.

INFUSUM RHEI PALMATI. *Ed.*

Infusion of Rhubarb.

Take of

Rhubarb, bruised, half an ounce;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce

Macerate the rhubarb in a close vessel with the water for twelve hours; then add the spirit, and strain the liquor.

INFUSUM RHEI. *Lond.*

Infusion of Rhubarb.

Take of

Rhubarb, sliced, a drachm;
Boiling water, half a pint.

Macerate for two hours, in a loosely covered vessel, and strain.

This appears to be one of the best preparations of rhubarb, when designed as a purgative; water extracting its virtue more effectually, than either vinous or spiritous menstrua.

INFUSUM ROSÆ GALLICÆ. *Ed.*
Infusion of Roses

Take of
  The petals of red roses, dried, one ounce;
  Boiling water, five pounds;
  Sulphuric acid, one drachm;
  White sugar, two ounces.
Macerate the petals with the boiling water in an earthen vessel, which is not glazed with lead, for four hours; then add the acid, strain the liquor, and dissolve the sugar in it.

INFUSUM ROSÆ. *Lond.*
Infusion of Roses.

Take of
  Dried red roses, half an ounce;
  Boiling water, two pints and a half;
  Diluted sulphuric acid, three fluidrachms;
  Double refined sugar, an ounce and a half.
First pour the water on the petals in a covered glass vessel, then add the diluted sulphuric acid, and macerate for half an hour. Strain the liquor, and add the sugar.

Dub.

Take of
  The petals of red rose buds, dried and heeled, half an ounce;
  Diluted sulphuric acid, three drachms, by weight;
  Boiling water, three pints;
  Double refined sugar, an ounce and a half.
First pour the water on the petals in a glass vessel, then add the acid, and digest for half an hour; filter the liquor when cold, and add the sugar.

The differences in the directions for preparing this infusion are immaterial. In fact, the rose leaves have very little effect, except in giving the mixture an elegant red colour. Its sub-acid and astringent virtues depend entirely on the sulphuric acid. Altogether, however, it is an elegant medicine, and forms a very grateful addition to juleps in hæmorrhagies, and in all cases which require mild coolers and sub-astringents: it is sometimes taken with boluses or electuaries of the bark, and likewise makes a good gargle.

INFUSUM SENNÆ. *Lond.*
Infusion of Senna.

Take of
  Senna, an ounce and a half;

Ginger, powdered, one drachm;
Boiling water, one pint.
Macerate them for an hour in a covered vessel, and strain the liquor when cold.

INFUSUM SENNÆ. *Dub.*
Infusion of Senna.

Take of
Senna, three drachms;
Lesser cardamom seeds, husked and bruised, half a drachm;
Boiling water, as much as will yield a filtered infusion of six ounces.
Digest for an hour, and filter, when cold.

THIS is a well contrived purgative infusion, the aromatic correcting the drastic effects of the senna. But the quantity ordered to be prepared at one time, by the London college, is much too large; for an ounce or two is a sufficient dose. It is of advantage that it should be used fresh prepared, as it is apt to spoil very quickly.

INFUSUM TAMARINDI CUM SENNA. *Edin.*
Infusion of Tamarinds and Senna.

Take of
Preserved tamarinds, one ounce;
Senna, one drachm;
Coriander seeds, bruised, half a drachm;
Brown sugar, half an ounce;
Boiling water, eight ounces.
Macerate for four hours, with occasional agitation, in a close earthen vessel, not glazed with lead, and strain the liquor.
It may also be made with double, triple, &c. the quantity of senna.

INFUSUM SENNÆ CUM TAMARINDIS. *Dub.*
Infusion of Senna with Tamarinds.

Add to the infusion of sennæ, before it be strained, an ounce of tamarinds; then strain.

THIS forms a mild and useful purge, excellently suited for delicate stomachs, and inflammatory diseases. The taste of the senna is well covered by the aromatic, sugar, and by the acidity of the tamarinds.

INFUSUM SIMAROUBÆ. *Lond.*
Infusion of Simarouba.

Take of
Simarouba bark, bruised, half a drachm;

Boiling water, half a pint.

Macerate for two hours in a loosely covered vessel, and strain.

A bitter aromatic.

INFUSUM TABACI. *Lon.*

Infusion of Tobacco.

Take of

Tobacco leaves, a drachm;

Boiling water, a pint.

Macerate for an hour in a loosely covered vessel, and strain.

This is a narcotic diuretic, which was used with much success in dropsies by Dr. Fowler.

INFUSUM VALERIANÆ. *Dub.*

Infusion of Valerian.

Take of

Valerian root, in coarse powder, two drachms;

Boiling water, seven ounces, by measure;

Digest for half an hour, and strain it when cold.

VALERIAN tea is a very excellent antispasmodic, and often proves serviceable in hysteric cases, where the stomach will not bear the powder in substance.

CHAP. XXV.—DECOCTIONS.

DECOCTIONS differ from infusions only in the action of the menstruum being assisted by a boiling heat. At the same time, however, that the increase of temperature facilitates and expedites the solution of some fixed principles, it gives others a tendency to decomposition, and dissipates all volatile matters. Decoction, therefore, can only be used with advantage for the extraction of principles which are neither volatilized nor altered by a boiling heat.

To promote the action of the menstruum, infusion is sometimes premised to decoction.

In compound decoctions, it is sometimes convenient not to put in all the ingredients from the first, but in succession, according to their hardness, and the difficulty with which their virtues are extracted; and if any aromatic, or other substances, containing volatile principles, enter into the composition, the boiling decoction is to be simply poured upon them, and covered up until it cool.

Decoctions should be made in vessels sufficiently large to prevent any risk of boiling over, and should be continued without interruption, and gently.

DECOCTUM ALOES COMPOSITUM. *Lond.*

Compound Decoction of Aloes.

Take of
  Extract of liquorice, half an ounce;
  Subcarbonate of potass, two scruples;
  Extract of spiked aloes, in powder,
  Myrrh, in powder,
  Saffron, each one drachm;
  Water, a pint.
Boil down to twelve fluidounces, and strain; then add of
  Compound tincture of cardamoms, four fluidounces.

This is intended as a simplification and improvement of the *Baume de Vie de la Lièvre.* It is in fact a sapinaceous solution of alves, the subcarbonate of potass rendering its resin soluble in water; and in many cases of stomach complaints, the combination of an alkali with a bitter purgative may be advantageous. In the dose of two or three tea-spoonfuls, it is slightly purgative. The original *Baume de vie*, which, however, contained no alkali, was much employed externally as a detersive application to recent wounds, and to prevent suppuration.

DECOCTUM ALTHÆÆ OFFICINALIS. *Ed.*

Decoction of Marshmallows.

Take of
  Dried marshmallow roots, bruised, four ounces;
  Raisins of the sun, stoned, two ounces;
  Water, seven pounds.
Boil down to five pounds; strain the decoction, and after the fæces have subsided, pour off the clear liquor.

Marshmallow roots contain nothing soluble in water, except mucilage, which is very abundant in them. This decoction is therefore to be considered merely as an emollient, rendered more pleasant by the acidulous sweetness of the raisins.

DECOCTUM ANTHEMIDIS NOBILIS; vulgo, DECOCTUM CHAMÆMELI sive COMMUNE. *Ed.*

Common Decoction, or *Decotion of* Chamomile.

Take of
  Chamomile flowers, dried, one ounce;

Carraway seeds, bruised, half an ounce;
Water, five pounds.
Boil for a quarter of an hour, and strain.

DECOCTUM CHAMÆMELI COMPOSITUM. *Dub.*
Compound Decoction of Chamomile.

Take of
Chamomile flowers, dried, half an ounce;
Sweet fennel-seeds, two drachms;
Water, one pint.
Boil a little, and strain.

DECOCTUM MALVAE COMPOSITUM. *Lond.*
Compound Decoction of Mallow.

Take of
The leaves of mallow, dried, one ounce;
Chamomile flowers, dried, half an ounce;
Water, one pint.
Boil for ten minutes, and strain.

THESE decoctions are merely solutions of bitter extractive, combined, in the third with mucilage, and in the others with essential oils. In making them, the aromatic substances should not be added until the decoction is nearly completed; for, otherwise, their flavour would be entirely dissipated.

It must, however, be acknowledged, that these impregnations are for the most part unnecessary for the purpose of glysters; and, in general, the bulk and warmth of these produce a discharge before these medicines can have any effect.

As fomentations, their virtues also depend, in a great measure, on the warm water, of which they principally consist; and when the herbs themselves are applied, they act only as retaining heat and moisture for a longer time; and are a less convenient, and not more useful fomentation, than cloths wrung out of hot water.

DECOCTUM CINCHONÆ OFFICINALIS. *Edin*
Decoction of Cinchona Bark.

Take of
Cinchona bark, in powder, one ounce;
Water, one pound and a half.
Boil for ten minutes in a covered vessel, and strain the liquor while hot.

DECOCTUM CINCHONÆ. *Lond.*
Decoction of Cinchona.

Take of
Cinchona bark, bruised, one ounce;
Water, one pint.

Boil for ten minutes in a covered vessel, and strain the liquor while hot.

DECOCTUM CORTICIS CINCHONÆ. *Dub.*

Decoction of Cinchona Bark.

Take of
Peruvian bark, in coarse powder, one ounce;
Water, one pint.

Boil for ten minutes in a vessel almost covered, and strain the liquor, while hot, through linen.

CINCHONA bark readily yields its active principles to the action of boiling water, and in greater quantity than cold water is capable of retaining dissolved; therefore, when a saturated decoction cools, it becomes turbid, and there is always a deposition of a yellowish or reddish powder, while the supernatant liquor is reduced to the strength of a saturated cold infusion. Decoction therefore presents us with an easy means of obtaining immediately an active preparation of cinchona bark, and with one of greater strength, than a cold, or even a warm infusion, provided it be drunk while tepid, and before it forms any deposition, or if the precipitate be diffused by agitation, after it is formed. As the precipitate contains no woody fibre, or other inert matter, it is extremely probable that, in very small doses, it would prove, if dried, a very powerful preparation of cinchona bark.

Formerly it was supposed that the strength of a decoction of cinchona bark, and similar substances, was increased by continuing the boiling for a great length of time; but this is now known to be a mistake; because water, at different temperatures, is capable of dissolving only a determinate proportion of its active principles; and therefore, as soon as it is saturated, any farther decoction is unnecessary. But, moreover, these principles, when dissolved in water, are liable to be decomposed, and become inert, by the absorption of atmospheric oxygen; and this decomposition is increased by increase of temperature; and as boiling constantly presents new surfaces to the action of the air, it is evidently hurtful when protracted longer than what is just necessary to saturate the water. Ten minutes is now supposed by the colleges to be sufficient for that purpose.

DECOCTUM DAPHNES MEZEREI. *Ed.*

Decoction of Mezereon.

Take of
The bark of mezereon root, two drachms;
Liquorice root, bruised, half an ounce;
Water, three pounds.

Boil, with a gentle heat, down to two pounds, and strain the decoction.

From four to eight ounces of this decoction may be given four times a-day, in some obstinate venereal and rheumatic affections. It operates chiefly by perspiration.

DECOCTUM DIGITALIS. *Dub.*

Decoction of Foxglove.

Take of
Foxglove leaves, dried, one drachm;
Water, as much as will furnish a strained decoction of eight ounces, by measure.
Place the vessel upon a slow fire, and, as soon as the liquor boils, remove it. Digest for a quarter of an hour, and strain.

This decoction, according to the proportions employed, is twenty times weaker than that so much praised by Dr. Darwin; but with a medicine of so great activity, it is an advantage to be able to regulate the doses easily; and it is probable that the strength of decoctions is not increased in proportion as the quantity of the menstruum is diminished.

DECOCTUM GEOFFRÆÆ INERMIS. *Ed.*

Decoction of Cabbage-tree Bark.

Take of
Bark of the cabbage-tree, powdered, one ounce;
Water, two pounds.
Boil, with a gentle fire, down to one pound, and strain the decoction.

This is a powerful anthelmintic. It may be given in doses of one table-spoonful to children, and four to adults. If disagreeable symptoms should arise from an over-dose, or from drinking cold water during its action, we must immediately purge with castor oil, and dilute with acidulated fluids.

DECOCTUM GUAIACI COMPOSITUM; vulgo DECOCTUM LIGNORUM. *Ed.*

Compound Decoction of Guaiacum, commonly called *Decoction of the Woods.*

Take of
Guaiacum raspings, three ounces;
Raisins, stoned, two ounces;
Sassafras root, sliced,
Liquorice root, bruised, each one ounce;
Water, ten pounds.

Boil the guaiacum and raisins with the water, over a gentle fire, to the consumption of one half, adding, towards the end, the sassafras and liquorice, and strain the decoction, without expression.

This decoction is of use in some rheumatic and cutaneous affections. It may be taken by itself, to the quantity of a quarter of a pint, twice or thrice a-day, or used as an assistant in a course of mercurial or antimonial alternatives; the patient, in either case, keeping warm, in order to promote the operation of the medicine.

DECOCTUM DULCAMARÆ. *Lond.*
Decoction of Bittersweet.

Take of
Twigs of bittersweet, sliced, one ounce;
Water, a pint and a half.
Boil to a pint, and strain.

For the virtues of this decoction, I must refer to what is said in the Materia Medica.

DECOCTUM HORDEI DISTICHI. *Ed.* DECOCTUM HORDEI. *Lond. Dub.*
Decoction of Barley. Barley Water.

Take of
Pearl barley, two ounces;
Water, five pounds; (four pints and a half, *Lond.*).
First wash off the mealy matter which adheres to the barley with some cold water; then extract the colouring matter, by boiling it a little with about half a pint of water. Throw this decoction away; and put the barley thus purified into five pints of boiling water, which is to be boiled down to one half, (two pints, *Lond.*); and strain the decoction.

DECOCTUM HORDEI COMPOSITUM. *Dub.*
Compound Decoction of Barley.

Take of
The decoction of barley, four pints;
Raisins, stoned, two ounces;
Figs, sliced, two ounces;
Liquorice root, sliced and bruised, half an ounce;
During the boiling, add the raisins first, and then the figs, and, lastly, the liquorice, a short time before it is finished, when the strained decoction ought to measure two pints.

Lond.

Take of
Decoction of barley, two pints;
Figs, sliced, two ounces;
Liquorice root, sliced and bruised, half an ounce;
Raisins, stoned, two ounces;
Water, a pint.
Boil down to two pints, and strain.

THESE liquors are to be used freely, as diluting drinks, in fevers and other acute disorders; hence it is of consequence that they should be prepared so as to be as elegant and agreeable as possible: for this reason they are inserted in the pharmacopœia, and the several circumstances which contribute to their elegance set down; for if any one of them be omitted, the beverage will be less grateful. As, however, they are much oftener prepared by nurses and servants than by the apothecary, these receipts might, with great advantage, be substituted for the ridiculous, and often dangerous, specifics with which domestic cookery-books abound. However trivial medicines of this class may appear to be, they are of greater importance in the cure of acute diseases than many more elaborate preparations.

DECOCTUM LICHENIS ISLANDICI. *Dub.*
Decoction of Iceland Moss.

Take of
Iceland moss, half one ounce;
Water, a pint.
Digest for two hours in a close vessel; then boil for a quarter of an hour, and strain the liquor while hot.

DECOCTUM LICHENIS. *Lond.*
Decoction of Iceland Moss.

Take of
Iceland moss, one ounce;
Water, an ounce and a half.
Boil to a pint, and strain.

I HAVE already given my opinion of the nature and effects of this mucilage. As in the present preparation the bitter principle is not removed, it may have some action as a tonic; but it renders it at the same time too nauseous to be used in sufficient quantity to have much effect as an article of diet.

DECOCTUM PAPAVERIS. *Lond.*
Decoction of Poppies.

Take of
White poppy heads, sliced, four ounces;

Water, four pints.
Boil for a quarter of an hour, and strain.

THIS is in very common use, as an anodyne fomentation.

DECOCTUM POLYGALÆ SENEGÆ. *Ed.*
Decoction of Seneka.

Take of
Seneka root, one ounce;
Water, two pounds.
Boil down to sixteen ounces, and strain the decoction.

DECOCTUM SENEGÆ. *Lond.*
Decoction of Snake Root.

Take of
Snake root, one ounce;
Water, two pints.
Boil to one pint, and strain.

THE virtues of this decoction will be easily understood from those of the root from which it is prepared. The dose in hydropic cases, and rheumatic or arthritic complaints, is two ounces, three or four times a-day, according to its effect. It is also recommended, in affections of the lungs, attended with debility, and inordinate secretion.

DECOCTUM SMILACIS SARSAPARILLÆ. *Ed.*
Decoction of Sarsaparilla.

Take of
The root of sarsaparilla, sliced, six ounces;
Distilled water, eight pints.
Digest for two hours, with a heat of about 195°; then take out the root, and bruise it; when bruised, put it back into the same liquor, boil down to four pints, then press out, and strain the decoction.

DECOCTUM SARSAPARILLÆ. *Dub.*
Decoction of Sarsaparilla.

Take of
Sarsaparilla, sliced, an ounce and a half;
Boiling water, two pints.
Digest in a moderate heat, for two hours, then take out the sarsaparilla and bruise it; when bruised, put it back into the liquor, and repeat the digestion for two hours; then express the liquor, after it has been reduced to one half, through linen, and strain it.

Lond.

Take of
Sarsaparilla, sliced, four ounces;
Boiling water, four pints.

Macerate for four hours in a loosely covered vessel, at the side of the fire; then take out the sarsaparilla root, and bruise it. When bruised put it again into the liquor; macerate for two hours more, then boil down to two pints, and strain.

This is at best a very doubtful remedy. Its diaphoretic effects are probably owing to its being drunk warm. It is totally incapable of curing syphilis; but by some it is thought useful in the sequelæ of that disease.

DECOCTUM SARSAPARILLÆ COMPOSITUM. *Dub.*

Compound Decoction of Sarsaparilla.

Take of
The root of sarsaparilla, sliced and bruised, an ounce and a half;
Bark of the root of sassafras,
Shavings of Guaiacum wood,
Liquorice root, bruised, of each two drachms;
Bark of mezereon root, one drachm;
Boiling water, three pints.

Macerate in the water, with a gentle heat, for three hours, the sarsaparilla, guaiac, and sassafras; then boil it down to one half, adding, towards the end of the boiling, the mezereon, and strain the liquor.

Lond.

Take of
Decoction of sarsaparilla, boiling hot, four pints;
Sassafras root, sliced,
Guaiac raspings,
Liquorice root, bruised, of each an ounce;
The bark of mezereon root, three drachms.

Boil for a quarter of an hour, and strain.

This compound decoction is said to be an improved mode of preparing the once highly celebrated Lisbon diet-drink, which, after its first introduction into Britain, was so long kept a secret.

It operates as a diaphoretic, and may be given with advantage in rheumatic cases, and in some of the sequelæ of syphilis. Three or four ounces may be taken four times a-day.

DECOCTUM ULMI. *Lond. Dub.*

Decoction of Elm.

Take of
The fresh inner bark of elm, bruised, four ounces;

Distilled water, four pints
Boil to two pints, and strain.

UNDER this form the elm bark has been highly celebrated for the cure of certain cutaneous eruptions; but undeservedly, according to the experience of the most judicious practitioners.

DECOCTUM VERATRI. *Lond.*
Decoction of White Hellebore.

Take of
The root of white hellebore, in powder, one ounce;
Water, two pints;
Rectified spirit of wine, two fluidounces.
Boil the water with the root to one pint, and strain; after the liquor is cold, add to it the spirit.

THIS decoction is only used externally as a wash, in tinea capitis, lepra, psora, &c. When the skin is very tender and irritable, it should be diluted with an equal quantity of water.

CHAP. XXVI.—MUCILAGES.

MUCILAGO AMYLI. *Ed. Lond. Dub.*
Mucilage of Starch.

Take of
Starch, half an ounce, (three drachms, *Lond.*);
Water, one pint.
Triturate the starch, gradually adding the water; then boil them a little.

THE mucilage thus formed is very useful in those cases where a glutinous substance is required; it is often successfully employed as a glyster, in diarrhœas depending on acrimony in the intestines.

MUCILAGO ASTRAGALI TRAGACANTHÆ. *Ed.*
Mucilage of Gum Tragacanth.

Take of
Gum tragacanth, in powder, one ounce;
Boiling water, eight ounces.
Macerate for twenty-four hours; then triturate carefully, that the gum may be dissolved; and press the mucilage through linen cloth.

MUCILAGO GUMMI TRAGACANTHÆ. *Dub.*
Mucilage of Tragacanth.

Take of
Gum tragacanth, in powder, two drachms;
Boiling water, eight ounces.
Macerate in a close vessel, till the gum be dissolved; then strain the mucilage through linen.

GUM TRAGACANTH is difficultly soluble in water. When macerated in it, it swells, but does not dissolve. To effect the solution, it must be beaten into a paste with some of the water; and the rest of the water must be added gradually, and incorporated with the paste, by beating them together. Gum tragacanth is a very tenacious substance, and requires a very large proportion of water to form a fluid mucilage. That of the Edinburgh college, which is made with eight parts of water to one of the gum, is a paste rather than a mucilage. The Dublin is made with thirty-two.

MUCILAGO MIMOSÆ NILOTICÆ. *Ed.*
Mucilage of Gum Arabic.

Take of
Gum Arabic, in powder, one part;
Boiling water, two parts.
Digest with frequent agitation, until the gum be dissolved; then press the mucilage through linen.

MUCILAGO ACACIÆ. *Lond.*
Mucilage of Acacia.

Take of
Gum Arabic, in powder, four ounces;
Boiling water, half a pint.
Triturate the gum with the water, gradually added, until it be dissolved.

MUCILAGO GUMMI ARABICI. *Dub.*
Mucilage of Gum Arabic.

Take of
Gum Arabic, in coarse powder, four ounces;
Boiling water, eight ounces, by measure.
Digest, with frequent agitation, till the gum be dissolved, then strain the mucilage through linen.

IT is very necessary to pass the mucilage through linen, in order to free it from pieces of wood and other impurities, which always adhere to the gum: the linen may be placed in a funnel.

Mucilage of gum Arabic is very useful in many operations in pharmacy; it is also much used for properties peculiar to substances of its own class; and of all the gums, it seems to be the purest.

DECOCTUM CYDONIÆ. *Lond.*
Decoction of Quince-seed.

Take of
  Quince-seeds, two drachms;
  Water, one pint.
Boil, with a slow fire, for ten minutes, and strain.

THIS mucilage, though sufficiently agreeable, is perfectly superfluous, especially as it is apt to spoil, from being mixed with the other principles of the seeds soluble in water. It is besides, never so transparent as mucilage carefully prepared from gum Arabic, is not cheaper, and is unfit for many purposes, being coagulated by acids.

CHAP. XXVII.—SYRUPS.

SYRUPI. *Dub.*
Syrups.

IN making syrups, where neither the weight of the sugar, nor the manner in which it should be dissolved, is directed, the following rule is to be followed.

Take of
  Double refined sugar, twenty-nine ounces;
  The liquor precribed, one pint.
Gradually add the sugar, and digest, with frequent agitation, in a close vessel, and in a moderate heat, until it be dissolved; then set it aside for twenty-four hours; take off the scum, and pour off the syrup from the fæces, if there be any.

Lond.

Syrups are to be kept in a place whose temperature never exceeds 50° Fahr.

SYRUPS are solutions of sugar in any watery fluid, whether simple or medicated. Simple syrup is nutritious and demulcent. When made of fine sugar, it is transparent and colourless. If necessary, it is easily clarified, by beating to a froth the white of an egg, with three or four ounces of water, mixing it with the syrup, and boiling the mixture for a few seconds, until the albumen coagulates, and enveloping all heterogenous matters, forms a scum, which may be easily taken off, or separated by filtration. When, instead of simple water, any other fluid is used for dissolving the sugar, the syrup is then medicated. Medicated syrups are prepared, either with expressed juices, infusions, decoctions, or saline fluids. The object of forming these into syrups, is either to render them agreeable to the palate, or to preserve them from fermentation. In the latter case, the quantity of sugar added becomes a matter of great importance; for, if too much be employed, the sugar will separate by crystallization; and, if too little, instead of preventing fermentation, it will accelerate it. About two parts of sugar to one of fluid are the proportions directed by the British colleges with this view. But, as in some instances, a larger quantity of fluid is added, and afterwards reduced to the proper quantity by decoction, it will not be superfluous to point out some circumstances, which show the evaporation to be carried far enough. These are the tendency to form a pellicle on its surface, when a drop of it is allowed to cool; the receding of the last portion of each drop, when poured out drop by drop, after it is cold; and, what is most to be relied on, its specific gravity when boiling hot, being about 1.3, or 1.385, when cold. The syrup which remains, after all the crystallizable sugar has been separated from it, has been much, and probably justly, recommended by some for the preparation of medicated syrups and electuaries, although its pharmaceutical superiority is actually owing to its impurity.

SYRUPUS SIMPLEX SIVE COMMUNIS. *Ed.*

Simple or *Common Syrup.*

Take of
  Double refined sugar, in powder, fifteen parts;
  Water, eight parts.
Let the sugar be dissolved by a gentle heat, and boiled a little, so as to form a syrup.

SYRUPUS. *Lond.*

Syrup.

Take of
  Refined sugar, two pounds and a half;
  Water, one pint.
Melt the sugar in the water, in a water-bath; let it stand for twenty-four hours, then skim it, and decant off the pure syrup from the fæces, if there be any.

Simple syrup should have neither flavour nor colour, and is more convenient in extemporaneous prescriptions than sugar undissolved.

SYRUPUS ACIDI ACETOSI. *Ed.*

Syrup of Acetous Acid.

Take of
  Acetous acid, two pounds and a half;
  Refined sugar, three pounds and a half;
Boil them, so as to form a syrup.

This is to be considered as simple syrup merely acidulated, and is by no means unpleasant. It is employed in mucilaginous mixtures, and the like; and, on account of its cheapness, it is often preferred to syrup of lemons.

SYRUPUS ALLII. *Dub.*

Syrup of Garlic.

Take of
  Garlic, sliced, one pound;
  Boiling water, two pints.
Macerate the water in the garlic, in a covered vessel, for twelve hours; then add the sugar to the strained liquor, and form a syrup.

This is a very disagreeable syrup; but when we wish to extract the virtues of garlic by a watery menstruum, it is the best means we can employ.

SYRUPUS ALTHÆÆ OFFICINALIS. *Ed.*

Syrup of Marshmallow.

Take of
  Fresh marshmallow roots, sliced, one pound;
  Water, ten pounds;
  Refined sugar, four pounds.
Boil the water with the roots to the consumption of one half, and strain the liquor, with strong expression. Suffer the strained decoction to remain at rest till the fæces have subsided; add the sugar to the depurated decoction, and boil, so as to make a syrup.

SYRUPUS ALTHÆÆ. *Lond.*

Syrup of Marshmallow.

Take of
  Fresh root of marshmallow, bruised, half a pound;
  Refined sugar, two pounds;
  Boiling water, four pints;

Boil the water with the marshmallow root to one half, and press out the liquor when cold. Set it by twenty-four hours; and after the fæces have subsided, pour off the liquor. Add the sugar, and boil it to a proper consistence.

THIS is merely a mucilaginous syrup, and is chiefly used in nephritic cases, for sweetening emollient decoctions, and the like.

SYRUPUS AMOMI ZINGIBERIS. *Ed.*

Syrup of Ginger.

Take of
  Beat ginger, three ounces;
  Boiling water, four pounds;
  Refined sugar, seven pounds and a half.

Macerate the ginger in the water, in a close vessel, for twenty-four hours; strain the infusion, and form a syrup, by adding the sugar.

SYRUPUS ZINGIBERIS. *Dub.*

Syrup of Ginger.

Take of
  Ginger, bruised, four ounces;
  Boiling water, three pints.

Macerate for twenty-four hours, and strain; then add the refined sugar, and make into a syrup.

Lond.

Take of
  Ginger, sliced, two ounces;
  Boiling water, one pint;
  Refined sugar, two pounds.

Macerate the ginger in the water for four hours, and strain; then add the sugar as directed, for making syrup.

THESE are agreeable and moderately aromatic syrups, impregnated with the flavour and virtues of the ginger.

SYRUPUS CITRI AURANTII. *Ed.*

Syrup of Orange-peel.

Take of
  The fresh outer rind of Seville oranges, six ounces;
  Boiling water, three pounds;
  Refined sugar, four pounds.

Macerate the rind in the water for twelve hours; then add to the filtered liquor the sugar, in powder, and, with a gentle heat, form a syrup.

SYRUPUS AURANTII. *Dub.*
Syrup of Orange-peel.

Take of
  Fresh outer rind of Seville oranges, eight ounces;
  Boiling water, six pints.
Macerate for twelve hours, in a close vessel; and, in the strained liquor, dissolve refined sugar, to make a syrup.

Lond.

Take of
  Fresh orange rind two ounces;
  Boiling water, one pint;
  Refined sugar, three pounds.
Macerate the rind in the water in a loosely covered vessel, for twelve hours; then pour off the liquor, and add the sugar.

In making this syrup, it is particularly necessary that the sugar be previously powdered, and dissolved in the infusion, with as gentle a heat as possible, to prevent the exhalation of the volatile parts of the peel. With these cautions, the syrup proves a very elegant and agreeable one, possessing a great share of the fine flavour of the orange-peel.

SYRUPUS CITRI MEDICI; olim SYRUPUS LIMONUM. *Ed.*
Syrup of Lemons.

Take of
  Juice of lemons, filtered after the fæces have subsided, three parts;
  Double refined sugar, five parts.
Dissolve the sugar in the juice, so as to make a syrup.

SYRUPUS LIMONIS. *Dub.*
Syrup of Lemons.

Take of
  Lemon juice, two pints.
As soon as the fæces have subsided, put it into a mattrass, immersed in boiling water, for about a quarter of an hour; when cold, strain it, and make it into a syrup.

In the same way is prepared
SYRUPUS SUCCI MORI. *Syrup of Mulberry.*

Lond.

Take of
  Strained lemon juice, one pint;
  Refined sugar, two pounds.
Dissolve the sugar in the lemon juice as directed for simple syrup.

These are very pleasant cooling syrups; and with this intention, they are occasionally used in draughts and juleps, for quenching thirst, abating heat, &c. in bilious or inflammatory distempers. They are sometimes, likewise, employed in gargarisms for inflammations of the mouth and tonsils.

SYRUPUS COLCHICI AUTUMNALIS. *Ed.*

Syrup of Colchicum.

Take of
Colchicum root, fresh, cut into thin slices, one ounce;
Vinegar, sixteen ounces;
Refined sugar, twenty-six ounces.

Macerate the root in the vinegar two days, occasionally shaking the vessel; then strain the infusion with gentle expression. To the strained infusion add the sugar, and boil a little, so as to form a syrup.

This syrup seems to be the best preparation of the colchicum. We must take care to gather this root in the proper season: and, from errors in this particular, we are to ascribe the uncertainty in the effects of this medicine as found in the shops.

It is chiefly employed as a diuretic, and may be taken from a drachm or two to the extent of an ounce, or more.

SYRUPUS DIANTHI CAROPHYLLI. *Ed.*

Syrup of Clove July-flower.

Take of
Clove July-flowers, fresh gathered, and freed from the heels, one pound;
Refined sugar, seven pounds;
Boiling water, four pounds.

Macerate the petals in the water for twelve hours; and dissolve in the filtered infusion the sugar in powder, by a gentle heat, so as to form a syrup.

SYRUPUS CARYOPHYLLI RUBRI. *Dub.*

Syrup of Clove July-flower.

Take of
Fresh clove July-flowers, two pounds;
Boiling distilled water, six pints.

Macerate for twelve hours in a glass vessel; and in the strained liquor dissolve refined sugar, so as to form a syrup.

As the beauty of the colour is principally attended to in this syrup, no force should be used in expressing the infusion from the flowers.

Some have substituted to it one easily prepared at seasons when the flowers are not to be procured: an ounce of spice-cloves is infused for some days in twelve ounces of white wine, the liquor strained, and with the addition of twenty ounces of sugar, boiled to the proper consistence of a syrup, to which a little cochineal gives a colour exactly similar to that prepared from the clove July-flower; and its flavour is of the same kind, though not so pleasant. The counterfeit may be readily detected, by adding to a little of the syrup some alkaline salt or ley; which will change the genuine syrup to a green colour; but, in the counterfeit, it will make no such alteration, only varying the shade of the red.

SYRUPUS CROCI. *Lond.*

Syrup of Saffron.

Take of
Saffron, one ounce;
Boiling water, one pint.
Refined sugar, two pounds and a half.
Macerate the saffron in the water for twelve hours, in a covered vessel; and dissolve the sugar in the strained liquor.

Saffron is very well fitted for making a syrup, as in this form a sufficient dose of it is contained in a reasonable bulk. This syrup is a pleasant cordial, and gives a fine colour to juleps.

SYRUPUS SENNÆ. *Dub.*

Syrup of Senna.

Take of
Manna,
Refined sugar, each one pound;
Senna, half an ounce;
Boiling water, a pint.
Macerate the senna in the water, in a covered vessel, for twelve hours; then, with the strained liquor mix the manna and the sugar, so that they may be dissolved.

Lond.

Take of
Senna leaves, one ounce;
Fennel seeds, bruised, one drachm;
Manna,
Refined sugar, each a pound;
Boiling water a pint.
Macerate the senna and fennel in the water for twelve hours. Strain the liquor, and mix with it the manna and sugar.

This syrup is a mild purgative, and well adapted to children and persons of a delicate constitution.

SYRUPUS PAPAVERIS SOMNIFERI. *Ed.*
Syrup of White Poppy.

Take of
White poppy heads, dried, and freed from the seeds, two pounds;
Boiling water, thirty pound
Refined sugar, four pounds.

Macerate the sliced heads in the water for twelve hours: boil the infusion till only one third part of the liquor remain; then strain the decoction with strong expression. Boil the strained decoction to the consumption of one half, and strain again; lastly, add the sugar, and boil a little, so as to form a syrup.

SYRUPUS PAPAVERIS. *Lond.*
Syrup of Poppy.

Take of
The heads of white poppies, dried and bruised, without the seeds, fourteeen ounces;
Refined sugar, two pounds;
Boiling water, two gallons and a half.

Boil them to one gallon in a water-bath, and strongly press out the decoction. Reduce this, by boiling, to two pints, and strain it while hot, set it aside for twelve hours that the fæces may subside. Boil the liquor, poured off from the fæces, to one pint, and dissolve the sugar in it, in the manner directed for making syrup.

Dub.

Take of
White poppy-heads, gathered unripe, dried, and emptied of their seeds, one pound;
Boiling water, three pints.

Slice and bruise the heads then pour on the water, and macerate for twelve hours; express the liquor, and evaporate in a moderate heat to one pint; strain through thin flannel, and set aside for six hours, to allow the fæces to subside: to the decanted liquor add the sugar, and make into a syrup.

This syrup, impregnated with the narcotic matter of the poppy-heads, is given to children, in doses of two or three drachms, and to adults, of half an ounce to an ounce and upwards, for easing pain, procuring rest, and answering the other intentions of mild opiates. Particular care is requisite in its preparation, that it may be always made, as nearly as possible, of the same strength; and accordingly the colleges have been very minute in their description of the process.

SYRUPUS OPII. *Dub.*

Syrup of Opium.

Take of
Watery extract of opium, eighteen grains;
Boiling water, half a pint.
Macerate until the opium be dissolved, then add sugar, so as to make a syrup

THIS syrup is an elegant substitute for the former. It is made with infinitely less trouble, and is always of an uniform strength. It contains about two grains and a half of opium in the ounce.

SYRUPUS PAPAVERIS ERRATICI. *Dub.*

Syrup of Red Poppy.

Take of
The fresh petals of the red poppy, one pound;
Boiling water, twenty ounces, by measure.
Put the flowers by degrees into the boiling water. After this, the vessel being removed from the fire, and taken out of the bath, macerate for twelve hours; then press out the liquor, and set it apart, that the fæces may subside. Lastly, make it into a syrup with refined sugar.

SYRUPUS RHŒADOS. *Lond.*

Syrup of Red Poppy.

Take of
Fresh petals of red poppy, one pound;
Boiling water, a pint and two fluidounces;
Refined sugar, two pounds and a half.
Gradually put the petals into the water, heated in a water-bath, stirring it occasionally, then having removed the vessel from the fire, macerate for twelve hours; express the liquor and set it aside, to let the impurities settle at the bottom: then add the sugar, as directed, for syrup.

THE design of putting the flowers into boiling water in a water-bath is, that they may be a little scalded, so as to shrink enough to be all immerged in the water; without this precaution they can scarce be all got in: but they are to be continued no longer over the fire than till this effect is produced, lest the liquor become too thick, and the syrup be rendered ropy.

As a medicine, it is perfectly insignificant.

SYRUPUS RHAMNI CATHARTICI. *Ed.*

Syrup of Buckthorn.

Take of

The juice of ripe buckthorn berries, depurated, two parts;
Refined sugar, one part.

Boil them, so as to form a syrup.

SYRUPUS RHAMNI. *Lond.*

Syrup of Buckthorn.

Take of

The fresh juice of ripe buckthorn berries, four pints;
Ginger, bruised,
Pimento, powdered, each half an ounce;
Refined sugar, three pounds and a half.

Set aside the juice for three days that the fæces may subside, and then strain it. Add the ginger and pimento to the strained juice for four hours; then macerate for four hours, and filter. Boil away the rest of the juice to one pint and a half; mix the liquor, and add the sugar as directed, for making a syrup.

Both these preparations, in doses of three or four spoonfuls, operate as brisk cathartics. The principal inconveniencies attending them are, their being very unpleasant, and their occasioning a thirst and dryness of the mouth and fauces, and sometimes violent gripes; these effects may be prevented by drinking liberally of water-gruel, or other warm liquids during the operation.

SYRUPUS ROSÆ GALLICÆ. *Ed.*

Syrup of Red Roses.

Take of

The dried petals of red roses, seven ounces;
Refined sugar, six pounds;
Boiling water, five pounds.

Macerate the roses in the water for twelve hours; then boil a little, and strain the liquor; add to it the sugar, and boil again for a little, so as to form a syrup.

This syrup is supposed to be mildly astringent, but is principally valued on account of its red colour.

SYRUPUS ROSÆ CENTIFOLIÆ. *Ed.*
Syrup of Damask Roses.

Take of
The fresh petals of the damask rose, one pound;
Boiling water, four pounds;
Refined sugar, three pounds.

Macerate the roses in the water for twelve hours; then to the infusion strained add the sugar, and boil them into a syrup.

SYRUPUS ROSÆ. *Lond.*
Syrup of Roses.

Take of
The dried petals of the damask rose, seven ounces;
Refined sugar, six pounds
Boiling water, four pints.

Macerate the roses in the water for twelve hours and strain. Evaporate the strained liquor, in a water-bath, to two pints and a half, and add the sugar, that it may be made a syrup.

THIS syrup is an agreeable and mild purgative for children, in the dose of half a spoonful, or a spoonful. It likewise proves gently laxative to adults; and with this intention may be of service in costive habits.

SYRUPUS SCILLÆ MARITIMÆ. *Ed.*
Syrup of Squills.

Take of
Vinegar of squills, two pounds;
Refined sugar, in powder, three pounds and a half.

Dissolve the sugar with a gentle heat, so as to form a syrup.

THIS syrup is used chiefly in doses of a spoonful or two, for promoting expectoration, which it does very powerfully. It is also given as an emetic to children.

SYRUPUS TOLUIFERÆ BALSAMI; vulgo SYRUPUS BALSAMICUS. *Ed.*
Syrup of Balsam of Tolu, formerly *Balsamic Syrup.*

Take of
Common syrup, two pounds;
Tincture of balsam of Tolu, one ounce.

With the syrup recently prepared, and when it has almost grown cold, after having been removed from the fire, gradually mix the tincture with constant agitation.

SYRUPUS TOLUTANUS. *ond*
Syrup of Tolu.

Take of
The balsam of Tolu, one ounce;
Boiling water, one pint.
Boil the balsam in the water for half an hour, in a covered vessel, shaking it occasionally; strain the liquor when cold, and add the sugar as in making syrup.

THE intention of the contrivers of the two foregoing processes seems to have been somewhat different. In the latter, which is certainly the most elegant, the benzoic acid of the balsam alone is contained; the other syrup contains the whole substance of the balsam in larger quantity. They are both moderately impregnated with the agreeable flavour of the balsam.

SYRUPUS VIOLÆ ODORATÆ. *Ed.*
Syrup of Violets.

Take of
Fresh violets, one pound;
Boiling water, four pounds;
Refined sugar, seven pounds and a half.
Macerate the violets in the water, for twenty-four hours, in a glass or glazed earthen vessel, close covered; then strain without expression, and to the strained infusion add the sugar, powdered, so as to form a syrup.

SYRUPUS VIOLÆ. *Dub.*
Syrup of Violets.

Take of
The fresh petals of the violet, two pounds;
Boiling distilled water, five pints.
Macerate for twenty-four hours; afterwards strain the liquor, without expression, through thin linen. Add double refined sugar, that it may be made a syrup.

THIS syrup has a very agreeable flavour; and, in the quantity of a spoonful or two, proves to children gently laxative. It is apt to lose, in keeping, the elegant blue colour, for which it is chiefly valued; and hence, some have been induced to counterfeit it, with materials whose colour is more permament, and which are more easily obtained. If the syrup be genuine, acids will change it red, and alkalies green; but if counterfeit, these changes will not happen. From this mutability of colour, the syrup of violet forms an excellent test of the presence of acids and alkalies; and it is also obvious, that a prescriber would be deceived, if he should expect, by means of it, to give a blue tinge to acidulated or alkalized juleps or mixtures.

CHAP. XXVIII.—MEDICATED HONEYS.

MEL DESPUMATUM. *Dub.* MELLIS DESPUMATIO. *Lond.* *Clarified Honey. The Clarification of Honey.*

Melt the honey in a water-bath, and remove the scum as it rises.

IN this simple process, the honey is rendered so liquid by the heat of the boiling water, that the wax and other lighter impurities which it commonly contains, rise to the surface, in the form of a scum, which is easily removed. At the same time, sand, or any heavy mixture of that kind, sinks to the bottom.

Honey was supposed to be peculiarly balsamic, and was therefore at one time much used in pharmacy. But as its saccharine matter is absolutely of the same nature with that of sugar, and as the extraneous matters which it always contains, make it disagree with the stomachs of many individuals, the number of medicated honeys has been much diminished, and their place in some instances supplied by syrups. Medicated honeys are known to be of a proper consistence, by allowing a small quantity to cool on a plate, if, when divided by the edge of a spoon, the portions do not immediately reunite, or if the specific gravity, when hot, be 1.26, or 1.31, when cold.

OXYMEL. *Lond. Dub.*
Oxymel.

Take of
  Clarified honey (honey, *Dub.*), two pounds;
  Distilled vinegar, one pound (one pint, *Dub.*);
Boil in a glass vessel with a gentle fire, to the consistency of a syrup (skimming it, *Dub.*).

THIS syrup is now rarely prepared by the apothecary, but is a favourite and useful domestic remedy in colds, and slight sore throats.

MEL BORACIS. *Lond.*

Honey of Borax.

Take of
  Borax, powdered, a drachm;
  Clarified honey, an ounce.
Mix them.

This is a useful formula, much employed as a detergent in aphthæ and ulcers of the mouth.

OXYMEL COLCHICI. *Dub.*

Oxymel of Meadow Saffron.

Take of
  The fresh root of meadow saffron, cut into thin slices, one ounce;
  Distilled vinegar, one pint;
  Clarified honey, two pounds, by weight.
Macerate the root of meadow saffron with the vinegar, in a glass vessel, with a gentle heat, for forty-eight hours. Strain the liquor, pressed out strongly from the root, and add the honey. Lastly, boil the mixture, frequently stirring it with a wooden spoon, to the thickness of a syrup.

This is an active preparation, but its use may be entirely superseded by the syrup of the same root.

MEL ROSÆ. *Dub.*

Honey of Roses.

Take of
  The petals of red rose buds, previously dried, with the heels cut off, four ounces;
  Boiling water, three pints;
  Honey, five pounds.
Macerate the rose leaves in the water for six hours; then mix the honey with the strained liquor, and boil the mixture to the thickness of a syrup, removing the scum.

Lond.

Take of
  Red rose petals, dried, four ounces;
  Boiling water, three pints;
  Clarified honey, five pounds.
Macerate the petals in the water for six hours, then add the honey to the filtered liquor, and boil down to a proper consistence, in a water-bath.

This preparation is not unfrequently used as a mild, cooling detergent, particularly in gargles for ulcerations and inflammation of the mouth and tonsils. The rose-buds here used should be hastily dried, that they may the better preserve their astringency.

The Dublin college, in making this and some similar preparations, used unclarified honey, with the idea, probably, that it may be equally well clarified in the course of the preparation itself. This is no doubt true; but as we do not know what effect the clarification may have on the active substances added to the honey, we think that the use of clarified honey, as directed by the London college, is preferable.

OXYMEL SCILLÆ. *Lond.* *Dub*
Oxymel of Squills.

Take of
Clarified honey. three pounds;
Vinegar of squills, two pints (two pounds, *Lond.*).
Boil them in a glass vessel, with a slow fire, to the thickness of a syrup.

Oxymel of squills is a useful aperient, detergent, and expectorant, and of great service in humorial asthmas, coughs, and other disorders where thick phlegm abounds. It is given in doses of two or three drachms, along with some aromatic water, as that of cinnamon, to prevent the great nausea which it would otherwise be apt to excite. In large doses, it proves emetic.

OXYMEL ÆRUGINIS. *Dub.*
Oxymel of Verdegris.
LINIMENTUM ÆRUGINIS. *Lond.*
Liniment of Verdegris.

Take of
Prepared verdegris, one ounce;
Vinegar, seven ounces, by measure;
Clarified honey, fourteen ounces, by weight.
Dissolve the verdegris in the vinegar, and strain it through linen; then add the honey, and boil the whole to a proper thickness.

When properly diluted with water, this preparation has been recommended in venereal ulcerations of the mouth and tonsils; although from the risk of a portion of it being swallowed, other detergent gargles are to be preferred. Externally it is applied, mixed with any digestive ointment, to destroy fungous flesh, and to excite unhealthy ulcers.

CHAP. XXIX.—EMULSIONS AND MIXTURES.

IN this chapter we comprehend those mixtures in which oils, and other substances, insoluble in water, are mixed with, and suspended in watery fluids, by means of viscid substances, such as mucilage and syrups.

EMULSIO AMYGDALÆ COMMUNIS. *Edin.*
Almond Emulsion.

Take of
Sweet almonds, one ounce;
Water, two pounds and a half.

Beat diligently the blanched almonds, in a stone mortar, gradually pouring on them the water; then strain the liquor.

LAC AMYGDALÆ. *Dub.*
Almond Milk.

Take of
Sweet almonds, blanched, an ounce and a half;
Refined sugar, half an ounce;
Water, two pints and a half.

Triturate the almonds with the sugar, adding the water by degrees, and strain the liquor.

MISTURA AMYGDULÆ. *Lond.*
Almond Mixture.

Take of
Almond confection, two ounces;
Distilled water, a pint.

Gradually add the water to the confection, and triturate.

EMULSIO NIMOSÆ NILOTICÆ; vulgo EMULSIO ARABICA. *Edin.*
Arabic Emulsion.

Is made in the same manner as the almond emulsion, only adding, while beating the almonds,
Mucilage of gum arabic, two ounces.

EMULSIO ARABICA. *Dub.*
Arabic Emulsion.

Take of
Gum arabic, in powder, two drachms;
Sweet almonds, blanched,
Refined sugar, each half a drachm;
Decoction of barley, one pint.

Dissolve the gum in the warm decoction, and when it is almost cold, pour it upon the almonds, previously well beaten with the sugar, and at the same time triturate them together, so as to form an emulsion, and then filter.

ALL these emulsions may be considered as possessing nearly the same qualities. They are merely mechanical suspensions of oil of almonds in watery fluids, by means either of the mucilage with which it is naturally combined in the almonds by itself, or assisted by the addition of gum arabic and sugar. Therefore, on standing for some days, the oily matter separates and rises to the top, not in a pure form, but like thick cream. By heat the same decomposition is immediately effected.

Great care should be taken that the almonds have not become rancid by keeping, which not only renders the emulsion extremely unpleasant, a circumstance of great consequence in a medicine that requires to be taken in large quantities, but likewise gives it injurious qualities.

The almonds are blanched by infusing them in boiling water, and peeling them. The success of the preparation depends upon beating the almonds to a smooth pulp, and triturating them with each portion of the watery fluid, so as to form an uniform mixture before another portion be added.

These liquors are principally used for diluting and correcting acrimonious humours; particularly in heat of urine and stranguries, arising either from a natural acrimony of the juices, or from the operation of cantharides, and other irritating medicines. In these cases, they are to be drunk frequently, to the quantity of half a pint or more at a time.

EMULSIO CAMPHORATA. *Ed.*
Camphorated Emulsion.

Take of
- Camphor, one scruple;
- Sweet almonds, blanched, two drachms;
- Refined sugar, one drachm;
- Water, six ounces.

This is made in the same manner as the common almond emulsion.

MISTURA CAMPHORÆ. *Dub.*
Camphorated Mixture.

Take of
- Camphor, half a drachm, (one scruple, *Dub.*);
- Rectified spirit of wine, (ten trops, *Dub.*); (ten minims, *Lond.*);
- (Refined sugar, half an ounce; *Dub.*)
- Water, one pint.

Rub the camphor first with the spirit of wine, (then with the sugar, *Dub.*); lastly, add the water by degrees, and strain the mixture.

Neither of these mixtures are very permanent, as the camphor separates and swims upon the surface in the course of a few days. As extemporaneous prescriptions, they are, however, very convenient modes of exhibiting that active drug, and may be given to the extent of a table spoonful every three or four hours in typhoid fevers.

LAC AMMONIACI. *Dub.*
Emulsion of Gum Ammoniac.

Take of

Gum ammoniac, one drachm;
Pennyroyal water, eight ounces;

Rub the gum resin with the Pennyroyal water, gradually poured on, until the mixture acquire a milky appearance. It is then to be strained through linen.

MISTURA AMMONIACI. *Lond.*
Mixture of Ammoniac.

Take of

Ammoniac, two drachms;
Water, one pint.

Triturate the ammoniac, with the water gradually added to it, until they are thoroughly mixed.

LAC ASSÆFŒTIDÆ. *Dub.*
Emulsion of Assa Fœtida.

Take of

Assafœtida, one drachm;
Pennyroyal water, eight ounces, by measure.

Triturate the assafœtida with the water, gradually added to it, till it form an emulsion.

MISTURA ASSAFŒTIDÆ. *Lond.*
Mixture of Assafœtida.

Take of

Assafœtida, two drachms;
Water, half a pint.

Tritutrate the assafœtida with the water, gradually added to it, until they become thoroughly mixed.

The lac ammoniaci is employed for attenuating tough phlegm, and promoting expectoration in humoral asthmas, coughs, and obstructions of the viscera. It may be given to the quantity of two spoonfuls twice a-day.

It answers the same purposes as assafœtida in substance, and on some occasions is a more convenient, though very disagreeable mode of exhibiting it.

Mistura Ferri Composita. *Lond.*
Compound Mixture of Iron.

Take of
- Myrrh in powder, one drachm;
- Subcarbonate of potass, twenty-five grains;
- Rose water, seven fluidounces and a half;
- Sulphate of iron, in powder, one scruple;
- Spirit of nutmeg, half a fluidounce;
- Refined sugar, a drachm.

Triturate the myrrh with the subcarbonate of potass and the sugar, and during the trituration, add first the rose water and spirit of nutmeg, and then the sulphate of iron. Immediately put the mixture into a proper glass bottle, and keep it well corked.

This is Griffith's celebrated tonic myrrh mixture. The myrrh is rendered more soluble, by forming a kind of soap with the alkali; a saponaceous emulsion is next formed, by the addition of the water, which is decomposed on the addition of the sulphate of iron. The alkali combines with the sulphuric acid, while the myrrh and black oxyde of iron remain suspended in the mixture. It must be carefully preserved from the action of the air, which would gradually convert the black oxide of iron into the red. It is not easy to powder the myrrh alone. It must be well dried, and powdered, in very cold weather.

MISTURA GUAIACI. *Lond.*
Guaiac Mixture.

Take of
- Guaiac, a drachm and a half;
- Refined sugar, two drachms;
- Mucilage of Acacia gum, two fluidrachms;
- Cinnamon water, eight fluidounces.

Triturate the guaiac with the sugar, then with the mucilage, and during the trituration with these, gradually add the cinnamon water.

This is one of the best forms of exhibiting guaiac, although it is not dissolved, but only mechanically suspended in the mixture, by means of the sugar and mucilage.

MISTURA MOSCHI. *Lond.*
Musk Mixture.

Take of
- Musk,
- Gum arabic, powdered;
- Refined sugar, of each one drachm;

Rose water, six fluidounces.
Rub the musk first with the sugar, then with the gum, and add the rose water by degrees.

UNLESS the musk be very thoroughly triturated with the sugar and gum before the addition of the water, it soon separates. An ounce, or an ounce and a half, may be taken for a dose.

POTIO CARBONATIS CALCIS; olim POTIO CRETACEA. *Edin.*

Chalk Potion.

Take of
Prepared carbonate of lime, one ounce;
Refined sugar, half an ounce;
Mucilage of gum arabic, two ounces.
Triturate together, and then gradually add of
Water, two pounds and a half;
Spirit of cinnamon, two ounces.
Mix them.

MISTURA CRETÆ. *Lond. Dub.*

Chalk Mixture.

Take of
Prepared chalk, half an ounce;
Refined sugar, three drachms;
Gum arabic, powered, one ounce (half an ounce, *Lond.*);
Distilled water, one pint.
Mix them by trituration.

THIS is a very elegant form of exhibiting chalk, and is an useful remedy in diseases arising from, or accompanied with, acidity in the primæ viæ. It is frequently employed in diarrhœa proceeding from that cause. The mucilage not only serves to keep the chalk uniformly diffused, but also improves its virtues. Of this medicine a pound or two may be taken in the course of a day.

MISTURA CORNU USTI. *Lond.* DECOCTUM CORNU CERVINI. *Dub*

Decoction of Hartshorn.

Take of
Burnt and prepared hartshorn, two ounces;
Gum arabic, in powder, one ounce (three drachms, *Dub.*);
Water, three pints.
Boil, constantly stirring, to two pints; and strain.

PREPARED hartshorn is phosphate of lime in a minute state of mechanical division. By boiling in a mucilaginous liquid, it will be diffused and imperfectly suspended, but not a particle of it will be dissolved. This is therefore an extremely injudicious preparation; for phosphate of lime would be much more easily and effectually suspended by triturating it with a larger proportion of gum arabic, and adding the water gradually. But we believe that this preparation has no other action than that of a weak mucilage.

ENEMA CATHARTICUM. *Dub.*

Purging Clyster.

Take of
Manna, one ounce.
Dissolve in ten ounces, by measure, of
Compound decoction of chamomile; then add of
Olive oil, one ounce;
Sulphate of magnesia, half an ounce.
Mix them.

ENEMA FŒTIDUM. *Dub.*

Fetid Enema

Is made by adding to the former two drachms of the tincture of assafœtida.

THESE are very useful extemporaneous preparations.

ACETICA.

CHAP. XXX.—MEDICATED VINEGARS.

INFUSIONS of vegetable substances in acetic acid are commonly called Medicated Vinegars. The action of the acid in this case may be considered as twofold.

1. It acts simply as water, in consequence of the great quantity of water which enters into its composition, and generally extracts every thing which water is capable of extracting.

2. It exerts its own peculiar action as an acid. In consequence of this it sometimes increases the solvent power of its watery portion, or disolves substances which water alone is

incapable of disolving, and in a few instances it impedes the solution of substances which water alone would dissolve.

As acetic acid, in itself sufficiently perishable, has its tendency to decomposition commonly increased by the solution of any vegetable matter in it, it should never be used as a menstruum, unless where it promotes the solution of the solvend, as in extracting the acrid principle of squills, colchicum, &c. and in disolving the volatile, and especially the empyreumatic oils, or where it coincides with the virtues of the solvend.

ACETUM AROMATICUM. *Ed.*

Aromatic Vinegar.

Take of

- Rosemary tops, dried,
- Sage leaves, dried, each four ounces;
- Lavender flowers, dried, two ounces;
- Cloves, two drachms;
- Distilled acetous acid, eight pounds.

Macerate for seven days, express the liquor, and strain it through paper.

This is given as an improved preparation of the *Vinaigre des quatre voleurs*, which was supposed to be a certain prophylactic against the contagion of plague and similar diseases. It is in fact a pleasant solution of essential oils in vinegar, which will have more effect in correcting bad smells, than in preventing fever.

ACETUM SCILLÆ MARITIMÆ. *Ed.*

Vinegar of Squills.

Take of

- Dried squills, two ounces;
- Distilled acetous acid, two pounds and a half;
- Alcohol, three ounces.

Macerate the squills in the acetous acid for seven days; then press out the liquor, to which add the alcohol; and when the fæces have subsided, pour off the clear liquor.

ACETUM SCILLÆ. *Lond.*

Vinegar of Squills.

Take of

- Squills, recently dried, one pound;
- Vinegar, six pints;
- Proof spirit, half a pint.

Macerate the squills with the vinegar in a glass vessel, with a gentle heat, for twenty-four hours; then express the liquor, and set it aside until the fæces subside. To the decanted liquor add the spirit.

Dub.

Take of
  Squills, recently dried, half a pound;
  Vinegar, three pints;
  Proof spirit, four ounces.
Macerate the squills in the vinegar for four days, in a glass vessel, frequently agitating it; then express the acid; to which, poured from the fæces after they have subsided, add the spirit.

VINEGAR of squills is a medicine of great antiquity. It is a very powerful stimulant; and hence it is frequently used, with great success, as a diuretic and expectorant. The dose of this medicine is from a drachm to half an ounce; where crudities abound in the first passages, it may be given at first in a larger dose, to evacuate them by vomiting. It is most conveniently exhibited along with cinnamon, or other agreeable aromatic waters, which prevent the nausea it would otherwise, even in small doses, be apt to occasion.

ACETUM COLCHICI. *Lond.*
Vinegar of Meadow saffron.

Take of
  Fresh root of meadow saffron, sliced, one ounce;
  Acetic acid, a pint;
  Proof spirit, a fluidounce;
Macerate the root with the vinegar, in a corked glass bottle, for 24 hours; then express the liquor, and set at rest to settle; lastly, add the spirit to the defaecated liquor.

THIS is substituted for the oxymel of the former edition of the London Pharmacopœia, and appears to be a more convenient form. It is said to be powerfully diuretic.

ACIDUM ACETICUM CAMPHORATUM. *Dub.* ACIDUM ACETOSUM CAMPHORATUM.
Camphorated Acetic Acid.

Take of
  Acetic acid, six ounces by measure;
  Camphor, half an ounce.
Reduce the camphor to powder, by triturating it with a little alcohol; then dissolve it in the acid.

THE alcohol in this preparation is used merely to facilitate the reduction of the camphor to powder; for the strong acetous, or, as we would rather call it, the acetic acid, is capable of dissolving even a larger proportion of camphor than is directed in the above formula.

This solution is a powerful analeptic remedy. Its vapour, snuffed up the nostrils, which is the only method of using it, is one of the most pungent stimuli we possess. It is so extremely volatile and corrosive, that it is difficult to preserve, except in glass phials, with ground glass stoppers, or in small gold boxes, such as are used for Henry's aromatic spirit of vinegar, for which it is in fact an officinal substitute.

CHAP. XXXI.—TINCTURES.

THE term Tincture has often been employed in a very vague sense. It is now commonly applied to solutions, made by infusion or digestion, in alcohol, or diluted alcohol. But it is also, though perhaps incorrectly, extended to solutions in ether, ethereal spirits, and spirit of ammonia.

Alcohol is capable of dissolving resins, gum resins, extractive, tannin, sugar, volatile oils, soaps, camphor, adipocere, colouring matters, acids, alkalies, and some compound salts. Many of these, as the gum resins, soaps, extractive, tannin, sugar, and saline substances, are also soluble in water, while water is capable of dissolving substances, such as gum, gelatin, and most of the compound salts, which are insoluble in alcohol. But the insolubility of these substances in the different menstrua is not absolute, but merely relative; for a certain proportion of alcohol may be added to a solution of gum in water without decomposing it; and a solution of resin in alcohol, will bear a certain admixture of water without becoming turbid. Therefore, diluted alcohol, which is a mixture of these two menstrua, sometimes extracts the virtues of heterogeneous compounds more completely than either of them separately.

Alcohol is used as a menstruum,

1. When the solvend is not soluble, or is only sparingly soluble in water.
2. When a watery solution of the solvend is extremely perishable.
3. When the use of alcohol is indicated as well as that of the solvend.

In making alcoholic tinctures, we must observe that the virtues of recent vegetable matters are very imperfectly extracted by spiritous menstrua. They must therefore be previously carefully dried, and as we cannot assist the solution by means of heat, we must facilitate it by the mechanical division of the solvend. A coarse powder often answers best, as, when too minute, it is apt to settle and agglutinate. To prevent loss, the solution is commonly made in a closs vessel, and the heat applied must be very gentle, lest it be broken by the expansion of vapour.

The action of tinctures on the living system is always compounded of the action of the menstruum, and of the matters dissolved in it. Now, these actions may either coincide with, or oppose, each other; and as alcohol is at all times a powerful agent, it is evident that no substance should be exhibited in the form of a tincture, whose action is different from that of alcohol, unless it be capable of operating in so small a dose, that the quantity of alcohol taken along with it is inconsiderable.

Tinctures are not liable to spoil, as it is called, but they must nevertheless be kept in well closed phials, especially when they contain active ingredients, to prevent the evaporation of the menstruum.

They generally operate in doses so small, that they are rarely exhibited by themselves, but commonly combined with some vehicle, which ought not to decompose the tincture, or at least not separate any thing from it in a palpable form.

The colleges direct all tinctures to be prepared in closed phials, to be frequently shaken during the process.

TINCTURA ALOES SOCOTORINÆ. *Ed.*
Tincture of Socotorine Aloes.

Take of
Socotorine aloes, in powder, half an ounce;
Extract of liquorice, an ounce and a half;
Alcohol, four ounces;
Water, one pound.

Digest for seven days in a closed vessel, with a gentle heat, and frequent agitation, and pour off the depurated tincture.

TINCTURA ALOES. *Dub.*
Tincture of Aloes.

Take of
Socotorine aloes, powdered, half an ounce;
Extract of liquorice, an ounce and a half;
Proof spirit, eight ounces, by measure.

Digest for seven days, then strain.

Lond.

Take of
Extract of spiked aloes, in powder, half an ounce;
Extract of liqourice, an ounce and a half;
Water, a pint;
Rectified spirit, four fluidounces.
Macerate in a stand-bath until the extracts be dissolved, then strain.

This is one of the simplest of the aloetic tinctures, and is one of the best formulæ for the exhibition of that useful drug in a fluid form. The liquorice is added to cover the taste of the aloes, and to assist in suspending them in the fluid. About an ounce may be taken for a dose.

TINCTURA ALOES ET MYRRHÆ. *Ed.*
Tincture of Aloes and Myrrh.

Take of
Myrrh, in powder, two ounces;
Alcohol, one pound and a half;
Water, half a pound.
Mix the alcohol with the water, then add the myrrh; digest for four days; and, lastly, add
Socotorine aloes, in powder, one ounce and a half;
Saffron, cut in pieces, one ounce.
Digest again for three days, and pour off the tincture from the sediment.

TINCTURA ALOES COMPOSITA. *Lond. Dub.*
Compound Tincture of Aloes.

Take of
Socotorine aloes,
Saffron, of each three ounces;
Tincture of myrrh, two pints.
Digest for seven days (a fortnight, *Lond.*), and strain.

This is supposed to be an improvement on the elixir proprietatis of Paracelsus. These tinctures differ considerably in strength; the latter contains one part of aloes to eight of the menstruum; the former one to sixteen, while the simple tincture already mentioned contains but one to thirty-two. In prescription these proportions must be attended to. The myrrh and saffron may add to its stimulating properties.

TINCTURA AMOMI REPENTIS. *Ed.*
Tincture of Cardamom.

Take of
Lesser cardamom seeds, bruised, four ounces

Diluted alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

TINCTURA CARDAMOMI. *Lond. Dub.*
Tincture of Cardamom.

Take of
Lesser cardamom seeds, husked and bruised, three ounces;
Proof spirit, two pints.
Digest for seven days (fourteen days, *Lond.*), and strain.

TINCTURE of Cardamoms has been in use for a considerable time It is a pleasant warm cordial; and may be taken, along with any proper vehicle, in doses of from a drachm to a spoonful or two.

TINCTURA CARDAMOMI COMPOSITA. *Lond. Dub.*
Compound Tincture of Cardamom.

Take of
Lesser cardamom seeds, husked and bruised,
Cochineal, in powder,
Caraway seeds, each powdered, two drachms;
Cinnamon, bruised, half an ounce;
(Raisins, stoned, four ounces, *Lond.*)
Proof spirit, two pints.
Digest for fourteen days, and strain.

THIS tincture is somewhat less stimulant than the compound tincture of cinnamon, which, besides a larger proportion of aromatics, contains also long pepper. The large proportion of raisins used by the London college forms only a very uneconomical and inelegant method of sweetening an aromatic tincture.

TINCTURA ANGUSTURÆ. *Dub.*
Tincture of Angustura.

Take of
Angustura bark, in coarse powder, two ounces.
Proof spirit of wine, two pints;
Digest for seven days, and filter.

ANGUSTURA bark readily gives out its active principles to alcohol; hence the tincture is a convenient and useful preparation.

TINCTURA ARISTOLOCHIÆ SERPENTARIÆ. *Ed.*
Tincture of Snake-root.

Take of
Virginian snake-root, bruised, two ounces;

Cochineal, in powder, one drachm ;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA SERPENTARIÆ. *Lond. Dub.*
Tincture of Snake-root.

Take of
Virginian snake-root, sliced and bruised, three ounces ;
Proof spirit, two pints ;
Digest for seven days (fourteen, *Lond.*), and strain.

THIS tincture, which contains the whole virtues of the root, may be taken to the quantity of a spoonful or more every five or six hours ; and to this extent it often operates as an useful diaphoretic.

TINCTURA AURANTII. *Lond. Dub.*
Tincture of Orange-peel.

Take of
Fresh orange-peel, three ounces ;
Proof spirit, two pints ;
Digest for three days (fourteen days, *Lond.*), and strain.

THIS tincture is an agreeable bitter, flavoured at the same time with the essential oil of the orange-peel.

TINCTURA BALSAMI PERUVIANI. *Lond.*
Tincture of Balsam of Peru.

Take of
Balsam of Peru, four ounces ;
Rectified spirit of wine, one pint ;
Digest until the balsam be dissolved.

THE balsam of Peru is totally soluble in alcohol, and is therefore well fitted for being exhibited in the form of a tincture ; but it is now very rarely employed.

TINCTURA BENZOIN COMPOSITA ; vulgo BALSAMUM TRAUMATICUM. *Ed.*
Compound Tincture of Benzoin. Traumatic Balsam.

Take of
Benzoin, in powder, three ounces ;
Balsam of Tolu, one ounce ;
Socotorine aloes, in powder, half an ounce ;
Alcohol, two pounds.
Digest with a gentle heat for seven days, and strain.

TINCTURA BENZOES COMPOSITA. *Dub.* TINCTURA BENZOINI COMPOSITA. *Lond.*

Compound Tincture of Benzoin.

Take of
- Benzoin, three ounces;
- Purified storax, two ounces;
- Balsam of Tolu, one ounce;
- Socotorine aloes, half an ounce;
- Rectified spirit of wine, two pints.

Digest for seven days (fourteen days, *Lond.*), and filter.

BOTH preparations may be considered as elegant simplifications of some very complicated compositions, which were celebrated under different names; such as Baume de Commandeur, Wade's balsam, Friars balsam, Jesuits drops, &c. These, in general, consisted of a confused farrago of discordant substances.

TINCTURA CAMPHORÆ. *Edin.* SPIRITUS CAMPHORATUS. *Dub.* SPIRITUS CAMPHORÆ. *Lond.*

Tincture of Camphor. Camphorated Spirit.

Take of
- Camphor, one ounce, *Ed. Dub.* four ounces, *Lond.*;
- Alcohol, one pound, *Ed.* eight ounces, by measure, *Dub.* two pints, *Lond.*

Mix them together, that the camphor may be dissolved.

(It may also be made with a double, triple, &c. proportion of camphor, *Ed.*)

THESE solutions of camphor are only employed for external uses, against rheumatic pains, paralytic numbnesses, inflammations, for discussing tumours, preventing gangrenes, or restraining their progress. They are too pungent to be exhibited internally, and cannot be diluted with water, without being totally decomposed.

TINCTURA CASCARILLÆ. *Lond. Dub.*

Tincture of Cascarilla.

Take of
- The bark of cascarilla, powdered, four ounces;
- Proof spirit, two pints.

Digest with a gentle heat for seven days (fourteen, *Lond.*), and strain.

THE proportion of alcohol is here so large, as indeed it is in most of the tinctures of this kind, that it is merely to be considered as a concealed dram.

TINCTURA CASTOREI. *Lond. Dub.*
Tincture of Castor.

Take of
Russian castor, powdered, two ounces;
Proof spirit, two pints.
Digest for seven days, and strain.

Edin.

Take of
Russian castor, an ounce and a half;
Alcohol, one pound.
Digest them for seven days, and strain through paper.

It has been disputed whether a weak or rectified spirit, and whether cold or warm digestion, are preferable for making this tincture; but, from experiment, it appears that castor, macerated without heat, gives out its finer and most grateful parts to either spirit, but most perfectly to the rectified: that heat enables both to extract the greatest part of its grosser and more nauseous matter; and that proof spirit extracts this last more readily than rectified.

The tincture of castor is recommended in most kinds of nervous complaints and hysteric disorders: in the latter, it sometimes does service, though many have complained of its proving ineffectual. The Dublin college has two tinctures of castor, which differ only, in the one being made with Russian, and the other with Canadian castor. The dose is from twenty drops to forty, fifty, or more.

TINCTURA CAPSICI. *Lond.*
Tincture of Capsicum.

Take of
Capsicum, powdered, an ounce;
Proof spirit, two pints.
Macerate for fourteen days, and filter.

This is a very powerful acrid stimulant. It has been recommended in gangrenous sore throats.

TINCTURA CINCHONÆ OFFICINALIS. *Ed.* TINCTURA CINCHONÆ. *Dub.*
Tincture of Cinchona.

Take of
Cinchona bark, in coarse powder, four ounces;
Diluted alcohol, two pounds and a half (two pints, *Dub.*).
Digest for seven days, and strain through paper.

TINCTURA CINCHONA. *Lond.*

Tincture of Cinchona.

Take of
- Lanceleaved cinchona, in powder, seven ounces;
- Proof spirit, two pints.

Macerate for fourteen days, and filter.

THIS tincture is certainly inpregnated with the virtues of cinchona, but not to such a degree that it can be given in sufficient doses to act as cinchona, without exhibiting more alcohol than what is proper to be given as a medicine. Indeed, we are afraid that this and other bitter and tonic tinctures, as they are called, are with some only an apology for dram-drinking, and that the most certain effects they produce are those of a slight degree of intoxication. That of the London college is the best, as containing most bark.

TINCTURA CINCHONÆ COMPOSITA. *Lond. Dub.*

Compound Tincture of Peruvian Bark.

Take of
- Peruvian bark, powdered, two ounces;
- Exterior peel of Seville oranges, dried, one ounce and a half (half an ounce, *Dub.*);
- Virginian snake-root, bruised, three drachms;
- Saffron, one drachm;
- Cochineal, powdered, two scruples;
- Proof spirit, twenty fluidounces.

Digest for fourteen days, and strain.

THIS is said to be the same with the celebrated *Huxham's Tincture of Bark.*

As a corroborant and stomachic, it is given in doses of two or three drachms: but when employed for the cure of intermittents, it must be taken to a greater extent.

TINCTURA CINNAMONI COMPOSITA; olim TINCTURA AROMATICA. *Ed.*

Compound Tincture of Cinnamon, formerly *Aromatic Tincture.*

Take of
- Cinnamon, bruised,
- Lesser cardamom seeds, bruised, each one ounce;
- Long pepper, in powder, two drachms;
- Diluted alcohol, two pounds and a half

Digest for seven days, and filter through paper.

Lond. Dub.

Take of
- Cinnamon, bruised, six drachms;
- Lesser cardamom seeds, bruised, three drachms;

Long pepper, in powder,
Ginger, in powder, of each two drachms;
Proof spirit, two pints.

Mix and digest for seven days (fourteen, *Lond.*), then strain.

In their formula, the Dublin and London colleges diminish the quantity of cardamom seeds, and substitute for it a proportion of ginger. This makes no alteration in the virtues of the preparation, which is a very warm aromatic, too hot to be given without dilution. A tea spoonful or two may be taken in wine, or any other convenient vehicle, in languors, weakness of the stomach, flatulencies, and other similar complaints; and in these cases it is often employed with advantage.

TINCTURA COLOMBÆ. *Ed.* TINCTURA COLUMBO. *Dub.* TINCTURA CALUMBÆ. *Lond.*

Tincture of Colomba.

Take of
Colomba root, powdered, two ounces (two ounces and a half, *Lond.*);
Proof spirit of wine, two pints.

Digest for seven days (fourteen days, *Lond.*), and filter through paper.

This is a very good stomachic tincture, which may be used when the stomach will not bear the colomba in powder.

TINCTURA CONVOLVULI JALAPÆ. *Ed.* TINCTURA JALAPÆ. *Lond. Dub.*

Tincture of Jalap.

Take of
Jalap, in coarse powder, three ounces (eight ounces, *Lond.* five, *Dub.*);
Diluted alcohol, fifteen ounces (two pints, *Lond. Dub.*).

Digest for seven days (fourteen, *Lond.*), and strain the tincture through paper.

Alcohol was formerly ordered for the preparation of this tincture; but diluted alcohol is a preferable menstruum, as it dissolves the active constituents of the jalap, as well as pure alcohol, and is less stimulating. The Edinburgh is the weakest, the London the strongest.

TINCTURA CROCI ANGLICI. *Ed.* TINCTURA CROCI. *Dub.*

Tincture of Saffron.

Take of
English saffron, cut in shreds, one ounce;
Diluted alcohol, fifteen ounces (one pint *Dub.*).

Digest for seven days, and strain through paper.

The proof spirit is a very proper menstruum for extracting the medical virtues of the saffron, and affords a convenient mode of exhibiting that drug.

TINCTURA DIGITALIS PURPUREÆ. *Ed.*

Tincture of Foxglove.

Take of
 The dried leaves of foxglove, one ounce;
 Diluted alcohol, eight ounces.
Digest for seven days, and strain through paper.

TINCTURA DIGITALIS. *Dub.*

Tincture of Foxglove.

Take of
 The leaves of foxglove, right dried, and in coarse powder, two ounces;
 Proof spirit, one pint.
Digest for seven days, and filter.

Lond.

Take of
 Leaves of foxglove, dried, four ounces;
 Proof spirit, two pints.
Macerate for fourteen days, and filter.

This tincture is a very powerful medicine, and contains the virtues of the foxglove in a very manageable form. It has been chiefly used to diminish the force of the circulation of the blood in hæmoptysis, and often with remarkable success. It has been also said to cure incipient phthisis pulmonalis; but subsequent experience has not confirmed the first trials. Like every other form in which foxglove is given, it should be given in very small doses at first, such as from ten to twenty drops, and cautiously increased.

TINCTURA FERULÆ ASSÆ FŒTIDÆ. *Ed.*

Tincture of Assafœtida.

Take of
 Assafœtida, four ounces;
 Alcohol, two pounds and a half;
 Digest for seven days, and strain through paper.

TINCTURA ASSA FOETIDÆ. *Lond.*

Tincture of Assafœtida.

Take of
 Assafœtida, four ounces;
 Rectified spirit, two pints.
Macerate for a fortnight, and filter.

Dub.

Take of
Assafœtida, four ounces;
Rectified spirit of wine, two pints;
Water, eight ounces.
Add the spirit to the assafœtida, triturated with the water, and digest for seven days; then strain.

THIS tincture possesses the virtues of the assafœtida, and may be given in doses of from ten drops to fifty or sixty.

TINCTURA GALBANI. *Dub.*

Tincture of Galbanum.

Take of
Galbanum, cut into small pieces, two ounces;
Proof spirit of wine, two pints.
Digest with a gentle heat for seven days, and strain.

THIS tincture, though not so powerful, is less nauseous than that of assafœtida, and therefore in some cases may be preferable.

TINCTURA GALLARUM. *Dub.*

Tincture of Galls.

Take of
Galls, in powder, four ounces;
Proof spirit, two pints.
Mix; digest for seven days, and filter.

THIS tincture, now for the first time introduced into practice by the Dublin college, is, I have no doubt, the most powerful of all the astringent tinctures.

TINCTURA GENTIANÆ COMPOSITA; vulgo ELIXIR STOMACHICUM. *Ed.*

Compound Tincture of Gentian, commonly called *Stomachic Elixir.*

Take of
Gentian root, sliced and bruised, two ounces;
Seville orange-peel, dried and bruised, one ounce;
Canella alba, bruised, half an ounce;
Cochineal, in powder, half a drachm;
Diluted alcohol, two pounds and a half.
Macerate for seven days, and strain through paper.

Lond. Dub.

Take of
Gentian root, sliced and bruised, two ounces;

Exterior dried peel of Seville oranges, one ounce;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof spirit of wine, two pints.
Digest for seven days, (fourteen, *Lond.*) and strain.

THESE are very elegant spiritous bitters. As the preparations are designed for keeping, lemon-peel, an excellent ingredient in the watery bitter infusions, has, on account of the perishableness of its flavour, no place in these.

TINCTURA GUAIACI OFFICINALIS. *Ed.*
Tincture of Guaiac.

Take of
Gum guaiac, in powder, one pound;
Alcohol, two pounds and a half.
Digest for ten days, and strain through paper.

TINCTURA GUAIACI. *Lond. Dub.*
Tincture of Guaiac.

Take of
Guaiac, four ounces (half a pound, *Lond.*);
Rectified spirit of wine, two pints.
Digest for seven days, (fourteen days, *Lond.*) and filter.

WHAT is called gum guaiac is in fact a resin, and perfectly soluble in alcohol. This solution is a powerful stimulating sudorific, and may be given in doses of about half an ounce, in rheumatic and arthritic cases. It was once supposed to be a specific against the gout.

TINCTURA HELLEBORI NIGRI. *Dub. Edin.*
Tincture of Black Hellebore.

Take of
Black hellebore, in coarse powder, four ounces;
Cochineal, powdered, two scruples (half a drachm, *Ed.*);
Proof spirit of wine, two pints (two pounds and a half, *Ed.*).
Digest, with a gentle heat, for seven days, and strain.

Lond.

Take of
Black hellebore, sliced, four ounces;
Proof spirit, two pints.
Macerate for fourteen days, and filter.

THIS is perhaps the best preparation of hellebore, when designed for an alterative, the menstruum here employed extracting the whole of its virtues. It has been found particularly serviceable in uterine obstructions. In sanguine constitutions where chalybeates are hurtful, it has been said that it seldom fails of exciting the menstrual evacuations, and removing the bad effects of their suppression. A tea spoonful of the tincture may be taken twice a-day in warm water, or any other convenient vehicle.

TINCTURA HUMULI. *Lond.*
Tincture of Hops.

Take of
  Hops, five ounces ;
  Proof spirit, two pints.
Macerate for fourteen days, and filter.

Opium in every form disagrees so completely with some people, as to render its exhibition to them improper. In these cases, we must have recourse to other narcotics, and of them the hop is one of the safest and most agreeable. Its comparative strength is not yet well ascertained, nor even the best form of exhibiting it. It is difficultly pulverizable, and in its natural form, it is so extremely light and bulky, as to absorb and retain a great deal of the spirit employed to extract a tincture from it, even when subjected to much compression.

TINCTURA HYOSCIAMI NIGRI. *Ed.*
Tincture of Henbane.

Take of
  The leaves of henbane, dried, one ounce ;
  Diluted alcohol, eight ounces,
Digest for seven days, and strain through paper.

TINCTURA HYOSCIAMI. *Lond. Dub.*
Tincture of Henbane.

Take of
  Henbane leaves, dried, (and in coarse powder, two ounces and a quarter *ub.)* four ounces, *Lond.*
  Proof spirit, (one pint *Dub.*) two pints, *Lond.*
Macerate for seven days, (fourteen, *Lond.*) and strain.

This tincture, although not yet come into general use, is a valuable anodyne, and in many cases may be substituted with advantage for the tincture of opium, especially where the latter produces obstinate constipation, or, instead of its usual soporific and sedative effects, causes uneasiness, restlessness, and universal irritation.

An anonymous correspondent observes, that it is useful in recent coughs, in doses for an adult of not less than thirty drops, with ten drops of laudanum, which is equal to thirty drops of the latter. Tincture of henbane alone sometimes purges; when this is an inconvenience, it is corrected by the addition of a few drops of laudanum.

TINCTURA KINO. *Edin. Dub. Lond.*
Tincture of Kino.

Take of
  Kino, in powder, two ounces (three ounces, *Dub. Lond.*);
  Diluted alcohol, a pound and a half (a pint and a half, *Dub.* two pints *Lond.*).
Digest for seven days, (fourteen days, *Lond.*) and strain through paper.

I HAVE already stated my reasons for believing kino to be a species of tannin. This is certainly a very astringent tincture, and will be found an excellent medicine in obstinate diarrhœas, and in lienteria.

TINCTURA LAURI CINNAMOMI. *Ed.*
Tincture of Cinnamon.

Take of
  Cinnamon, bruised, three ounces;
  Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA CINNAMOMI. *Lond. Dub.*
Tincture of Cinnamon.

Take of
  Cinnamon, bruised, three ounces (three ounces and a half, *Dub.*);
  Proof spirit of wine, two pints.
Digest for seven days, (fourteen days, *Lond.*) and strain.

THE tincture of cinnamon possesses the astringent virtues of the cinnamon, as well as its aromatic cordial ones; and in this respect it differs from the spirit prepared by distillation.

SPIRITUS LAVANDULÆ COMPOSITUS. *Edin.*
Compound Spirit of Lavender.

Take of
  Spirit of lavender, three pounds;
  Spirit of rosemary, one pound;
  Cinnamon, bruised, one ounce;
  Cloves, bruised, two drachms;
  Nutmeg, bruised, half an ounce;
  Red sanders wood, in shavings, three drachms.
Macerate for seven days, and filter.

SPIRITUS LAVANDULÆ COMPOSITUS. *Lond. Dub.*
Compound Spirit of Lavender.

Take of
- Spirit of lavender, three pints;
- Spirit of rosemary, one pint;
- Cinnamon, bruised,
- Nutmegs, bruised, of each half an ounce;
- (Cloves, two drachms, *Dub.*)
- Red saunders wood, one ounce.

Digest for ten days, (fourteen days, *Lond.*) and strain.

THESE preparations do not differ materially. They are grateful cordials, of which from ten to a hundred drops may be conveniently taken, dropt upon sugar. It does not appear very clearly whether they should be considered as spirits or tinctures; for although the spirit of lavender be the predominant ingredient, yet the mode of preparation is that of a tincture, and the spirit as a menstruum dissolves astringent, colouring, and other substances, which would not rise with it in distillation.

TINCTURA MELOES VESICATORII. *Ed.*
Tincture of Cantharides.

Take of
- Cantharides, bruised, one drachm;
- Diluted alcohol, one pound.

Digest for seven days, and strain through paper.

TINCTURA CANTHARIDIS. *Dub.*
Tincture of Spanish Flies.

Take of
- Bruised Cantharides, two drachms;
- Cochineal, powdered, half a drachm;
- Proof spirit, one pint and a half.

Digest for seven days, and strain.

TINCTURA LYTTÆ. *Lond.*
Tincture of Cantharides.

Take of
- Cantharides, bruised, three drachms;
- Proof spirit, two pints.

Macerate for fourteen days, and strain.

THIS tincture contains the active principle of the cantharides, whatever it may be. It is applied externally as a stimulant and rubefacient, and is sometimes given internally, in doses of from ten to twenty drops, as a diuretic, or as a stimulant in gleets and gonorrhœa.

TINCTURA MIMOSÆ CATECHU; olim TINCTURA JAPONICA. *Ed.* TINCTURA CATECHU. *Lond. Dub.*

Tincture of Catechu. Japonic Tincture.

Take of
- Extract of catechu, three ounces;
- Cinnamon, bruised, two ounces;
- Diluted alcohol, two pounds and a half (two pints, *Lond. Dub.*).

Digest for seven days, (fourteen, *Lond.*) and strain through paper.

THE cinnamon is a very useful addition to the catechu, not only as warming the stomach, but likewise as covering its taste.

This tincture is of service in all kinds of defluxions, catarrhs, looseness, uterine fluxes, and other disorders, where astringent medicines are indicated. Two or three tea spoonfuls may be taken every now and then in red wine, or any other proper vehicle.

TINCTURA MOSCHI. *Dub.*

Tincture of Musk.

Take of
- Musk, in powder, two drachms;
- Rectified spirit of wine, one pint.

Digest for seven days, and strain.

RECTIFIED spirit is the most complete menstruum for musk; but in this form it is often impossible to give a sufficient quantity of the musk.

TINCTURA MYRRHÆ. *Ed.*

Tincture of Myrrh.

Take of
- Myrrh, in powder, three ounces;
- Alcohol, twenty ounces;
- Water, ten ounces.

Digest for seven days, and strain through paper.

Lond.

Take of
- Myrrh, bruised, three ounces;
- Rectified spirit, twenty-two fluidounces,
- Water, a pint and a half.

Macerate for fourteen days, and strain.

Dub.

Take of
- Myrrh, bruised three ounces;

Proof spirit of wine, a pint and a half;
Rectified spirit of wine, half a pint.
Digest for seven days, and filter.

TINCTURE of myrrh is recommended internally as a cardiac, for removing obstructions, particularly those of the uterine vessels, and resisting putrefaction. The dose is from fifteen drops to forty or more. The medicine may perhaps be given in these cases to advantage; though, with us, it is more commonly used externally, for cleansing foul ulcers, and promoting the exfoliation of carious bones.

TINCTURA OPII, SIVE THEBAICA; vulgo LAUDANUM LIQUIDUM. *Ed.*

Tincture of Opium, or *Thebaic Tincture,* commonly called *Liquid Laudanum.*

Take of
Opium, two ounces;
Diluted alcohol, two pounds.
Digest for seven days, and filter through paper.

Dub.

Take of
Hard purified opium, powdered, ten drachms;
Proof spirit of wine, one pint.
Digest for seven days, and strain.

Lond.

Take of
Hard opium, powdered, two ounces and a half;
Proof spirit, two pints
Macerate for fourteen days, and strain.

As these tinctures, on evaporation, furnish the same quantity of extract, they are believed to be of nearly equal strength; but it is to be regretted that they are not so well adapted for keeping as could be wished: after some time, a part of the opium is gradually deposited from both, and consequently the tinctures become weaker: the part which thus separates, amounts sometimes, it it said, to near one fourth of the quantity of opium at first dissolved.

TINCTURA CAMPHORÆ COMPOSITA. *Lond.* TINCTURA OPII CAMPHORATA, sive ELIXIR PAREGORICUM. *Dub.*

Compound Tincture of Camphor. Camphorated Tincture of Opium; Paregoric Elixir.

Take of
Camphor, two scruples;

Hard purified opium, in powder,
Benzoic acid, of each one drachm;
(Essential oil of aniseed, one drachm, *Dub.*)
Proof spirit of wine, two pints.
Digest for fourteen days, (seven, *Dub.*) and strain.

In this formula, the virtues of the opium and camphor are combined. It gets an agreeable flavour from the acid of benzoin and essential oil. The latter also renders it more stimulating; but whether it derives any salutary virtues from the former, we do not know. It was originally prescribed under the title of Elixir Asthmaticum, which it does not ill deserve. It contributes to allay the tickling which provokes frequent coughing; and at the same time it is supposed to open the breast, and give greater liberty of breathing. It is given to children against the chincough, &c. in doses of from five drops to twenty: to adults, from twenty to an hundred. Half an ounce, by measure, contains about a grain of opium.

TINCTURA QUASSIÆ. *Dub.*
Tincture of Quassia.

Take of
Shavings of quassia, one ounce;
Proof spirit, two pints.
Digest for seven days, and filter.

As the Dublin college have introduced into their Pharmacopœia the most powerful of all astringent tinctures, in the present instance, they have also first directed a tincture to be prepared from the purest and most intense of all bitters.

TINCTURA RHEI PALMATI. *Ed.*
Tincture of Rhubarb.

Take of
Rhubarb, sliced, three ounces;
Lesser cardamom seeds, bruised, half an ounce;
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA RHABARBARI. *Dub.* TINCTURA RHEI. *Lond.*
Tincture of Rhubarb.

Take of
Rhubarb, cut into pieces, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
(Liquorice root, bruised, half an ounce, *Dub.*)
Saffron, two drachms;

Proof spirit of wine, two pints.
Digest for seven days, (fourteen days, *Lond.*) and strain.

TINCTURA RHEI COMPOSITA. *Lond.*
Compound Tincture of Rhubarb.

Take of
Rhubarb, sliced, two ounces;
Liquorice root, bruised, half an ounce;
Ginger, sliced,
Saffron, each two drachms;
Water,
Proof spirit of wine, each twelve fluidounces,
Digest for fourteen days, and strain.

TINCTURA RHEI ET ALOES; olim ELIXIR SACRUM. *Ed.*
Tincture of Rhubarb with Aloes, commonly called *Sacred Elixir.*

Take of
Rhubarb, sliced, ten drachms;
Socotorine aloes, in powder, six drachms;
Lesser cardamom seeds, bruised, half an ounce
Diluted alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA RHEI ET GENTIANÆ; olim TINCTURA RHEI AMARA. *Ed.*
Tincture of Rhubarb with Gentian, formerly *Bitter Tincture of Rhubarb.*

Take of
Rhubarb, sliced, two ounces;
Gentian root, sliced, half an ounce;
Diluted alcohol, two pounds and a half;
Digest for seven days, and strain through paper.

ALL the foregoing tinctures of rhubarb are designed as stomachics and corroborants, as well as purgatives: spiritous liquors excellently extract those parts of the rhubarb in which the two first qualities reside, and the additional ingredients considerably promote their efficacy. In weakness of the stomach, indigestion, laxity of the intestines, diarrhœas, colic, and other similar complaints, these medicines are frequently of great service.

TINCTURA SAPONIS; vulgo LINIMENTUM SAPONACEUM Edin.
Tincture of Soap, formerly *Saponaceous Liniment.*

Take of
Soap, in shavings, four ounces;
Camphor, two ounces;

Volatile oil of rosemary, half an ounce;
Alcohol, two pounds.

Digest the soap in the alcohol for three days; then add to the filtered liquor the camphor and the oil, shaking them well together.

LINIMENTUM SAPONIS COMPOSITUM. *Lond.* LINIMENTUM SAPONIS. *Dub.*

Compound Soap Liniment.

Take of
Soap, three ounces;
Camphor, one ounce;
Spirit of rosemary, one pint.

(Digest the soap in the spirit of rosemary until it be dissolved, and add to it the camphor. *Dub.*)

(Dissolve the camphor in the spirit, than add the soap and macerate in a sand-bath until it be dissolved, *Lond.*)

TINCTURA SAPONIS ET OPII; olim LINIMENTUM ANODYNUM. *Ed.*

Tincture of Soap with Opium, formerly *Anodyne Liniment.*

THIS is prepared in the same way, and from the same substances, as the simple tincture of soap, but with the addition from the beginning of
Opium, one ounce.

THESE tinctures are only used externally, and possess great efficacy in removing local pains, when rubbed on the affected part. The London and Dublin colleges have omitted the anodyne liniment, probably as it may be easily prepared extemporaneously, by mixing a proportion of laudanum with soap liniment.

TINCTURA SCILLÆ. *Lond. Dub.*

Tincture of Squills.

Take of
Squills, fresh dried, four ounces;
Proof spirit of wine, two pints.

(Digest for fourteen days, and strain, *Lond.*)

(Digest for seven days; then set it aside, and when the fæces have subsided, pour off the pure liquor, *Dub.*)

THE active principle of squills is soluble in alcohol, and there are cases in which a tincture may be useful.

TINCTURA SENNÆ COMPOSITA; vulgo ELIXIR SALUTIS. *Ed.*

Compound Tincture of Senna, commonly called *Elixir of Health.*

Take of
- Senna leaves, two ounces;
- Jalap root, bruised, one ounce;
- Coriander seeds, bruised, half an ounce;
- Diluted alcohol, three pounds and a half.

Digest for seven days, and to the liquor, filtered through paper, add,
- Double refined sugar, four ounces.

TINCTURA SENNÆ. *Lond. Dub.*

Tincture of Senna.

Take of
- Senna leaves, one pound (three ounces, *Lond.*);
- Caraway seeds, bruised, one ounce and a half (three drachms, *Lond.*);
- Lesser cardamom seeds, bruised, and husked, half an ounce (one drachm, *Lond.*);
- Raisins, stoned, sixteen ounces (four ounces, *Lond.*);
- Proof spirit, one gallon (two pints, *Lond.*).

Digest for fourteen days, and strain.

BOTH these tinctures are useful carminatives and cathartics, especially to those who have accustomed themselves to the use of spiritous liquors; they often relieve flatulent complaints and colics, where the common cordials have little effect; the dose is from one to two ounces.

TINCTURA TOLUIFERI BALSAMI; olim TINCTURA TOLUTANA. *Edin.* TINCTURA BALSAMI TOLUTANI. *Dub.*

Tincture of the Balsam of Tolu.

Take of
- Balsam of Tolu, an ounce and a half (one ounce, *Dub.*);
- Alcohol one pound (one pint, *Dub.*).

Digest until the balsam be dissolved; and then strain the tincture through paper.

THIS solution of balsam of Tolu possesses all the virtues of the balsam itself. It may be taken internally, with the several intentions for which that balsam is proper, to the quantity of a tea spoonful or two, in any convenient vehicle. Mixed with simple syrup, it forms an elegant balsamic syrup.

TINCTURA VALERIANÆ. *Lond. Dub.*

Tincture of Valerian.

Take of
The root of wild valerian, in coarse powder, four ounces;
Proof spirit of wine, two pints.
Digest with a gentle heat, for seven days, (fourteen, *Lond.*) and strain.

The valerian root ought to be reduced to a pretty fine powder, otherwise the spirit will not sufficiently extract its virtues. The tincture has a deep colour, and is strongly impregnated with the valerian; though it has not been found to answer so well in the cure of epileptic disorders as the root in substance, exhibited in the form of powder or bolus. The dose of the tincture is from half a spoonful to a spoonful or more, two or three times a-day.

TINCTURA VERATRI ALBI. *Ed.*

Tincture of White Hellebore.

Take of
White hellebore root, bruised, eight ounces;
Diluted alcohol, two pounds and a half.
Digest them together for seven days, and filter the tincture through paper.

This tincture is sometimes used for assisting cathartics, &c. and as an emetic in apoplectic and maniacal disorders. It may likewise be so managed, as to prove a powerful alterative and deobstruent, in cases where milder remedies have little effect. But a great deal of caution is requisite in its use; the dose, at first, ought to be only a few drops; if considerable, it proves violently emetic or cathartic.

TINCTURA ZINGIBERIS. *Lond. Dub.*

Tincture of Ginger.

Take of
Ginger, in coarse powder, two ounces;
Proof spirit, two pints.
Digest in a gentle heat for seven days, (fourteen, *Lond.*) and strain.

This tincture is cordial and stimulant, and is only employed as a corrigent to purgative draughts.

CHAP. XXXII.

TINCTURES MADE WITH ETHEREAL SPIRITS.

We have classed these tinctures by themselves, because they are more strongly characterised by the nature of the menstruum than of the substances dissolved in it. Indeed, the ethereal spirits are used in these instances, not to dissolve substances which would resist the action of alcohol and water, but for the sake of their own direct action on the system.

TINCTURA ALOES ÆTHEREA. *Ed.*

Ethereal Tincture of Aloes.

Take of
  Socotorine aloes,
  Myrrh, of each, in powder, one ounce and a half;
  English saffron, sliced, one ounce;
  Sulphuric ether, with alcohol, one pound.
Digest the myrrh with the sulphuric ether with alcohol for four days, in a close vessel; then add the saffron and aloes.
Digest again for four days, and, when the fæces have subsided, pour off the tincture.

This tincture agrees generally in its effects with the other tinctures of aloes, the only difference arising from the more penetrating and stimulating nature of the menstruum itself.

ÆTHER SULPHURICUS CUM ALCOHOLE AROMATICUS. *Ed.*

Aromatic Sulphuric Ether with Alcohol.

This is made of the same aromatics, and in the same manner, as the compound tincture of cinnamon; except that, in place of alcohol, sulphuric ether with alcohol is employed.

This is designed for persons whose stomachs are too weak to bear the following acid tincture: to the taste it is gratefully aromatic, without any perceptible acidity.

ACIDUM SULPHURICUM AROMATICUM. *Ed.*

Aromatic Sulphuric Acid.

Take of
  Alcohol, two pounds;
  Sulphuric acid, six ounces.
Drop the acid gradually into the alcohol. Digest the mixture

with a very gentle heat, in a close vessel, for three days, and then add of

Cinnamon, bruised, an ounce and a half;
Ginger, bruised, one ounce.

Digest again, in a close vessel, for six days, and then filter the tincture through paper placed in a glass funnel.

ALTHOUGH the name given to this preparation by the college does not sanction its arrangement with the ethereal tinctures, yet I have ventured to place it here, from the belief that the alcohol is completely or partially changed, by the digestion with the acid, into an ethereal spirit; and that the principal difference between this and the preceding tincture consists in the presence of the acid, which, however, is not to be considered as the menstruum by which the tincture is formed, but as an acid mixed with the ethereal tincture.

Medical use.—This is a valuable medicine in weakness and relaxation of the stomach, and decay of constitution, particularly in those which proceed from irregularities, which are accompanied with slow febrile symptoms, or which follow the suppression of intermittents. It frequently succeeds, after bitters and aromatics by themselves have availed nothing; and indeed great part of its virtues depend on the sulphuric acid; which, barely diluted with water, has, in those cases where the stomach could bear the acidity, produced happy effects.

It is very usefully conjoined with cinchona, and other tonic barks, both as covering their disagreeable taste, and as coinciding with them in virtue. It may be given in doses of from ten to thirty drops, or more, several times a-day.

CHAP. XXXIII.

AMMONIATED OR VOLATILE TINCTURES.

AMMONIA, like ether, is so powerful an agent on the living system, that we think it gives a peculiar character to the compositions into which it enters. They are all highly stimulating and pungent, and apt to excite diaphoresis. As ammonia exerts considerable and peculiar powers as a solvent, these tinctures must never be combined in prescription with any thing acid, which would not only neutralize the ammonia, and destroy its peculiar action on the living system, but would precipitate whatever was dissolved by its agency.

LINIMENTUM CAMPHORÆ COMPOSITUM. *Lond.*

Compound Camphor Liniment.

Take of
  Camphor, two ounces;
  Water of ammonia, six fluidounces;
  Spirit of lavender, a pint.

Mix the water of ammonia with the spirit; and distil from a glass retort, with a slow fire, a pint. Then dissolve the camphor in the distilled liquor.

This is more pungent and penetrating than the solution of camphor in alcohol.

TINCTURA CASTOREI COMPOSITA. *Ed.*

Compound Tincture of Castor.

Take of
  Russian castor, in powder, one ounce;
  Assafœtida, half an ounce;
  Ammoniated alcohol, one pound.

Digest for seven days, and filter through paper.

This composition is a medicine of real efficacy, particularly in hysterical disorders, and the several symptoms which accompany them. The spirit here used is an excellent menstruum, both for the castor and the assafœtida, and greatly adds to their virtues.

TINCTURA GUAIACI AMMONIATA. *Ed. Dub.*

Ammoniated Tincture of Guaiac.

Take of
  Resin of guaiac, in powder, four ounces;
  Ammoniated alcohol, one pound and a half (one pint and a half, *Dub.*).

Digest for seven days, and filter through paper.

Lond.

Take of
  Guaiac, in powder, four ounces;
  Compound spirit of ammonia, a pint and a half.

Digest for fourteen days, and filter.

These are very elegant and efficacious tinctures; the ammoniated spirit readily dissolving the resin, and, at the same time, promoting its medicinal virtue. In rheumatic cases, a tea, or even table, spoonful, taken every morning and evening, in any convenient vehicle, particularly in milk, has proved of singular service.

TINCTURA OPII AMMONIATA; olim ELIXIR PAREGORICUM. *Ed.*

Ammoniated Tincture of Opium, formerly *Paregoric Elixir.*

Take of
- Benzoic acid,
- English saffron, sliced, of each three drachms;
- Opium, two drachms;
- Volatile oil of aniseed, half a drachm;
- Ammoniated alcohol, sixteen ounces.

Digest for seven days, in a close vessel, and filter through paper.

THIS is a preparation of considerable efficacy in many spasmodic diseases, as chincough, &c. the ammonia removing the spasm immediately, while the opium tends to prevent its return. Each drachm contains about a grain of opium.

TINCTURA VALERIANÆ AMMONIATA. *Lond.*

Ammoniated Tincture of Valerian.

Take of
- Wild valerian, in coarse powder, four ounces;
- Aromatic spirit of ammonia, two pints.

Macerate for fourteen days, and strain.

Dub.

Take of
- Valerian root, in powder, two ounces;
- Spirit of ammonia, one pint.

Digest for seven days, and filter.

THE spirit of ammonia, both simple and compound, is here an excellent menstruum, and, at the same time, considerably promotes the virtues of the valerian, which, in some cases, wants assistance of this kind. The dose may be a tea spoonful or two.

CHAP. XXXIV.—MEDICATED WINES.

PARMENTIER has occupied thiry-two pages of the Annales de Chimie, to prove that wine is an extremely bad menstruum for extracting the virtues of medical substances. His only argument is, that, by the infusion of vegetable substances in wine, its natural tendency to decomposition is so much accelerated, that at the end of the process, instead of wine, we have only a liquor containing the elements of bad vinegar. As a solvent, diluted alcohol perfectly supersedes the use of wine; and if we wish to use wine to cover the taste, or to assist the operation of any medicine, M. Parmentier proposes, that a tincture of the substance should be extemporaneously mixed with wine as a vehicle.

Notwithstanding this argument appears to us to have great weight, we shall give to the medicated wines, retained in the pharmacopœias, the characters they still generally possess.

VINUM ALOES SOCOTORINÆ; vulgo TINCTURA SACRA. *Ed.*

Wine of Socotorine Aloes, commonly called *Sacred Tincture.*

Take of

Socotorine aloes, in powder, one ounce;
Lesser cardamom seeds, bruised,
Ginger, bruised, each one drachm;
Spanish white wine, two pounds.

Digest for seven days, stirring now and then, and afterwards strain.

VINUM ALOES. *Dub.*

Wine of Aloes.

Take of

Socotorine aloes, four ounces;
Canella alba, one ounce;
Spanish white wine, three pints;
Proof spirit, one pint.

Powder the aloes and canella alba separately; then mix and pour on the wine, mixed with the spirit; afterwards digest for fourteen days, frequently shaking the vessel; and, lastly, filter the liquor.

Lond.

Take of

Socotorine aloes, eight ounces;
Canella alba, two ounces;
Wine, six pints;
Proof spirit, two pints.

Triturate the aloes with white sand washed clean, to powder; also powder the canella, and pour the wine and spirit upon these powders mixed together. Macerate for fourteen days, now and then shaking them, and strain.

The sand is added to facilitate the pulverization of the aloes, and to prevent it, when moistened by the fluids, from running together into masses. It is evident, that it does not affect the tincture.

This medicine has long been in great esteem, not only as a cathartic, but likewise as a stimulus.

It appears from long experience to be a very useful medicine The dose, as a purgative, is from one to two ounces. It may be introduced into the habit, so as to be productive of excellent effects, as an alterant, by giving it in small doses, at proper intervals. Thus managed, it does not for a considerable time operate remarkably by stool ; but at length proves purgative, and occasions a lax habit, of much longer continuance than that produced by the other common cathartics.

VINUM GENTIANÆ COMPOSITUM; vulgo VINUM AMARUM. *d.*

Compound Wine of Gentian, commonly called *Bitter Wine.*

Take of

Gentian root, half an ounce ;
Cinchona bark, one ounce :
Seville orange-peel, dried, two drachms ;
Canella alba one drachm ;
Diluted alcohol, four ounces ;
Spanish white wine, two pounds and a half.

First pour the diluted alcohol on the root and barks, sliced and bruised, and, after twenty-four hours, add the wine ; then macerate for seven days, and strain.

This wine, which is a pleasant bitter, is intended as a substitute for the old *Tinctura ad Stomachicos.* Wines of this kind are sometimes introduced at the tables of epicures in Italy, to assist the stomach in digestion.

VINUM IPECACUANHÆ. *Lond. Dub.*

Wine of Ipecacuanha.

Take of

The root of ipecacuan, bruised, two ounces ;
Spanish white wine, two pints.

Digest for fourteen days, (seven days, *Dub.*) and strain.

Ed.

Take of

Ipecacuan, bruised, one ounce ;
Spanish white wine, fifteen ounces.

Macerate for seven days, and filter through paper.

Both these wines are very mild and safe emetics, and equally serviceable, in dysenteries, with the ipecacuanha in substance, this root yielding nearly all its virtues to the Spanish white wine. The common dose is an ounce, more or less, according to the age and strength of the patient.

VINUM NICOTIANÆ TABACI. *Ed.*
Tobacco Wine.

Take of
  The dried leaves of tobacco, one ounce;
  Spanish white wine, one pound.
Macerate for seven days, and strain the liquor through paper.

Wine seems to extract more fully the active principles of the tobacco than either water or spirit taken separately.

VINUM OPII. *Lond.*
Wine of Opium.

Take of
  Extract of opium, an ounce;
  Cinnamon, bruised,
  Cloves, bruised, of each one drachm;
  Wine, a pint.
Macerate for eight days, and filter.

This is the Tinctura Thebaica of the Dispensatory 1745; the Laudanum Liquidum of Hoffman, which has continued to be a popular, notwithstanding its exclusion from the late Pharmacopœias. Mr. Ware, in particular, considers it as superior to every other solution of opium as an application in chronic inflammation of the eyes; and, with the same intention, it is sometimes used when inspissated by spontaneous evaporation.

VINUM RHEI PALMATI. *Ed.*
Rhubarb Wine.

Take of
  Rhubarb, sliced, two ounces;
  Canella alba, bruised, one drachm;
  Diluted alcohol, two ounces;
  Spanish white wine, fifteen ounces.
Macerate for seven days, and strain through paper.

This is a warm, cordial, laxative medicine. It is used chiefly in weakness of the stomach and bowels, and some kinds of loosenesses, for evacuating the offending matter, and strengthening the tone of the viscera. It may be given in doses of from half a spoonful to three or four spoonfuls or more, according to the circumstances of the disorder, and the strength of the patient.

CHAP. XXXV.—EXTRACTS AND RESINS.

EXTRACT, in pharmacy, has long been used, in the common and true acceptation of the term, to express a thing extracted, and therefore it was applied to substances of all kinds which were extracted from heterogeneous bodies, by the action of any menstruum, and again reduced to a consistent form, by the evaporation of that menstruum. Lately, however, Extract has been used in a different and much more limited sense, as the name for a peculiar principle, which is often indeed contained in extracts, and which before had no proper appellation. It is in the former sense that we employ it here, and in which we wish it to be only used, while a new word should be invented as the name of the new substance. Till a better be proposed, we shall call it *Extractive*.

Extracts are of various kinds, according to the nature of the substances from which they are obtained, and the menstruum employed: but they commonly consist of gum, sugar, extractive, tannin, cinchonin, gallic acid, or resin, or several of them mixed in various proportions. The menstrua most commonly employed are water and alcohol. The former is capable of extracting all the substances enumerated, except the resin, and the latter all except the gum. Wine is also sometimes employed, but very improperly; for, as a solvent, it can only act as a mixture of alcohol and water, and the principles which it leaves behind, on evaporation, are rather injurious than of advantage to the extract.

Water is the menstruum most economically employed in making extracts, as it is capable of dissolving all the active principles except resin, and can have its solvent powers assisted by a considerable degree of heat.

Watery extracts are prepared by boiling the subject in water, and evaporating the strained decoction to a thick consistence.

It is indifferent, with regard to the medicine, whether the subject be used fresh or dry; since nothing that can be preserved in this process will be lost by drying. With regard to the facility of extraction, however, there is a very considerable difference; vegetables in general giving out their virtues more readily when dried than when fresh.

In many cases, it is necessary to assist the action of the menstruum by mechanical division, but it should not be carried so far as to reduce the substance to a very fine powder; as Fabbroni found that cinchona, at least, yielded a larger proportion of extract, when only coarsely powdered.

The quantity of water ought to be no greater than is necessary for extracting the virtues of the subject. This point, however, is not very easily ascertained; for, although some of the common principles of extracts be soluble in a very small proportion of water, there are others, such as the tannin, of which water can dissolve only a certain proportion, and cannot be made to take up more by any length of boiling; besides, we have no very good method of knowing when we have used a sufficient quantity of water; for vegetable substances will continue to colour deeply successive portions of water boiled with them, long after they are yielding nothing to it but colouring matter. One of the best methods is to boil the subject in successive quantities of water, as long as the decoctions form a considerable precipitate with the test which is proper for detecting the substance we are extracting, such as a solution of gelatin for tannin, of alum for extractive, &c.

The decoctions are to be evaporated after they have been filtered, boiling hot, without any farther depuration; because some of the most active principles of vegetable substances, such as tannin, are much more soluble in boiling than in cold water, and because almost all of them are very quickly affected by exposure to the atmosphere. Therefore, if a boiling decoction, saturated with tannin, be allowed to cool, the greatest part of the very principle on which the activity of the substance depends, will separate to the bottom, and, according to the usual directions, will be thrown away as sediment. The same objection applies more strongly to allowing the decoction to cool, and deposite a fresh sediment, after it has been partially evaporated. Besides, by allowing the decoctions to stand several days before we proceed to their evaporation, we are, in fact, allowing the active principles contained in the decoction to be altered by the action of the air, and to be converted into substances, perhaps inactive, which also are thrown away as sediment.

The evaporation is most conveniently performed in broad shallow vessels; the larger the surface of the liquor, the sooner will the aqueous parts exhale. This effect may likewise be promoted by agitation.

When the matter begins to grow thick, great care is necessary to prevent its burning. This accident, almost unavoidable if the quantity be large, and the fire applied, as usual, under the evaporating basin, may be effectually prevented, by pouring the extract, when it has acquired the consistence of a syrup, into shallow tin or earthen pans, and placing these in an oven with its door open, moderately heated: which, acting uniformly on every part of the liquid, will soon reduce it to any degree of consistence required. This may likewise be done, and more securely, by setting the evaporating vessel in boiling water; but the evaporation is in this way very tedious.

Alcohol is much too expensive to be employed as a menstruum for obtaining extracts, except in those cases where water is totally inadequate to the purpose. These cases are,

1st, When the nature of the extract is very perishable when dissolved in water, so that it is liable to be decomposed before the evaporation can be completed, especially if we cannot proceed immediately to the evaporation.

2dly, When water is totally incapable of dissolving the substance to be extracted; and,

3dly, When the substance extracted can bear the heat of boiling alcohol without being evaporated, but would be dissipated by that of boiling water; that is, when it requires a heat greater than 176°, and less than 212°, for its vaporization.

In the last case, the alcohol must be perfectly free from water, because the heat necessary to evaporate it at the end of the process would frustrate the whole operation Hence, also, the subject itself ought always to be dry: those substances which lose their virtue by drying, lose it equally on being submitted to this treatment with the purest alcohol.

In this way the alcoholic extract of some aromatic substances, as cinnamon, lavender, rosemary, retain a considerable degree of their fine flavour.

In the second case, the alcohol need not be so very strong, because it is capable of dissolving resinous substances, although diluted with a considerable proportion of water.

In the first case, the alcohol may be still much weaker; or rather, the addition of a small proportion of alcohol to water will be sufficient to retard or prevent the decomposition of the decoction.

The alcohol employed in all these cases should be perfectly free from any unpleasant flavour, lest it be communicated to the extract.

The inspissation should be performed from the beginning, in the gentle heat of a water-bath. We need not suffer the alcohol to evaporate in the air: the greatest part of it may be recovered by collecting the vapour in common distilling vessels. If the distilled spirit be found to have brought over any flavour from the subject, it may be advantageously reserved for the same purposes again.

When diluted alcohol is employed, the distillation should only be continued as long as alcohol comes over; and the evaporation should be finished in wide open vessels

In this chapter we have also included the processes intended for purifying inspissated juices and resinous substances, and the inspissated juices of the London Pharmacopœia, having neglected to insert them in their proper place, in consequence of being misled, by the new denominations given them, to suppose that they were entirely rejected.

Pure resins are prepared, by adding, to spiritous tinctures of resinous vegetables, a large quantity of water. The resin, incapable of remaining dissolved in the watery liquor, separates and falls to the bottom; leaving in the menstruum such other principles of the plant as the spirit might have extracted at first along with it. But this is only practised for the purpose of analysis.

EXTRACTS MADE WITH WATER.

EXTRACTUM GENTIANÆ LUTEÆ. *Ed.*

Extract of Gentian.

Take of

Gentian root, any quantity.

Having cut and bruised it, pour upon it eight times its quantity of distilled water. Boil to the consumption of one half of the liquor, and strain it by strong expression. Evaporate the decoction immediately, to the consistence of thick honey, in a bath of water, saturated with muriate of soda.

EXTRACTA. *Lond.*

Extracts.

In preparing extracts of every kind, evaporate the fluid in a pan, in a water-bath, as quickly as possible, until it become of a proper thickness for forming into pills, stirring it constantly towards the end with a spatula.

Sprinkle a little rectified spirit on all softer extracts.

EXTRACTA SIMPLICIORA. *Dub.*

Simple Extracts.

All simple extracts, unless otherwise ordered, are to be prepared according to the following rule:

The vegetable matter is to be boiled, in eight times its weight of water, to one half; the liquor is then to be expressed, and, after the fæces have subsided, to be filtered; it is then to be evaporated, with a heat between 200° and 212°, until it becomes thickish; and, lastly, it is to be evaporated with a heat less than 200°, and frequently stirred, until it acquire a consistence proper for forming pills.

All extracts, when they begin to get thick, ought to be frequently stirred with a clean iron spatula. They may be reduced to a proper thickness by means of a stove, heated on purpose.

They ought to be preserved as much as possible from the contact of the air, and the softer ones are to be sprinkled with rectified spirit.

In this manner are prepared,

EXTRACTA	*Extracts of*
Cacuminum ABSINTHII. *Dub.*	Wormwood.
Radicis GLYCYRRHIZÆ GLABRÆ. *Ed.*	Liquorice.
——— GLYCYRRHIZÆ. *Dub.*	
——— HELLEBORI NIGRI. *Ed. Dub.*	Black Hellebore.
——— GENTIANÆ LUTEÆ. *Ed.*	Gentian.
——— GENTIANÆ. *Dub.*	
Radicis JALAPÆ. *Dub.*	Jalap.
Foliorum RUTÆ GRAVEOLENTIS. *Ed.*	Rue.
——— RUTÆ. *Dub.*	
——— CASSIÆ SENNÆ. *Ed.*	Senna.
——— SABINÆ. *Dub.*	Savin.
Florum ANTHEMIDIS NOBILIS. *Ed.*	Chamomile.
——— CHAMÆMELI. *Dub.*	
Capitum PAPAVERIS SOMNIFERI. *Ed.*	Poppy-heads.
Cacuminum GENISTÆ. *Dub.*	Broom-tops.
Ligni HÆMATOXYLI CAMPECHIANI. *Ed.*	Logwood.
Scobis HÆMATOXYLI. *Dub.*	
Corticis QUERCUS. *Dub.*	Oak bark.
Herbæ et Radicis TARAXACI. *Dub.*	Dandelion.

EXTRACTUM ACONITI. *Lond.*

Extract of Monkshood.

Take of

Monkshood leaves, one pound.

Bruise them in a stone mortar, sprinkling a little water upon them; then express the juice, and evaporate it, without separating the sediment, to a proper thickness.

THIS is properly an inspissated juice, analogous to the Edinburgh preparations under that title.

EXTRACTUM ALOES. *Lond.*

Extract of Aloes.

Take of

Extract of socotorine aloes, in powder, half a pound;
Boiling water, four pints.

Macerate, in a gentle heat, for three days, then strain, and set it at rest till the fæces subside. Pour off the clear liquor, and evaporate to a proper thickness.

THIS is supposed to be less irritating than the aloes itself, but it appears to be an unnecessary refinement. The name is also objectionable, as being liable to be confounded with the crude aloes. It would have been better, *Extractum Aloes Purificatum.*

EXTRACTUM ANTHEMIDIS. *Lond.*

Extract of Chamomile.

Take of

Chamomile flowers, dried, one pound;

Water, one gallon.

Boil to four pounds, and filter the liquor while hot. Then evaporate to a proper thickness.

EXTRACTUM BELLADONNÆ. *Lond.*

Extract of Bittersweet.

Take of

Fresh bittersweet leaves, one pound.

Bruise in a stone mortar with a little water; then express the juice, and evaporate it, without pouring it from the sediment, to a proper thickness.

EXTRACTUM CICHONÆ. *Lond.*

Extract of Cinchona.

Take of

Lanceleaved cinchona bark, bruised, one pound;

Water, a gallon.

Boil to six pints, and pour off the liquor while hot. With the same quantity of water, and in the same manner, repeat the boiling four times. Then reduce all these liquors, mixed together, to a proper thickness, by evaporation

This extract must be prepared under two forms; one *soft*, and fit for making pills; the other *hard* and pulverizable.

EXTRACTUM CINCHONÆ. *Dub.*

Extract of Cinchona.

Take of

Cinchona, in coarse powder, one pound;

Water, six pints.

Boil, for a quarter of an hour, in a vessel almost covered; filter the decoction while hot, and set it aside. Boil the residuum again, in the same quantity of water, and filter it in the same manner. This may be repeated a third time, and all the decoctions are to be mixed and reduced to a proper degree of thickness by evaporation.

This extract ought to be kept in two states; one soft, adapted for making pills; and the other hard, capable of being pulverised.

EXTRACTUM CONII *Lond.*

Extract of Hemlock.

Take of

Fresh hemlock, a pound.

Bruise in a stone mortar, with a little water, then express the juice, and evaporate it without pouring from the fæces, to a proper thickness

EXTRACTUM COLOCYNTHIDIS. *Lond.*

Extract of Colocynth.

Take of
- Pulp of colocynth, a pound;
- Water, a gallon.

Boil to four pounds, and filter the liquor while hot. Evaporate to a proper thickness.

EXTRACTUM COLOCYNHTIDIS COMPOSITUM. *Lond.*

Compound Extract of Colocynth.

Take of
- Pulp of colocynth, sliced, six drachms;
- Socotorine aloes, in powder, an ounce and a half;
- Scammony, in powder, half an ounce;
- Cardamom seeds, powdered, a drachm;
- Hard soap, three drachms;
- Boiling water, two pints.

Macerate the pulp of colocynth in the water, with a gentle heat, for four days. Strain the liquor, and add to it the aloes, scammony, and soap. Then evaporate to a proper thickness, adding, towards the end of the operation, the cardamon seeds.

Dub.

Take of
- Pith of colocynth, cut small, six drachms;
- Hepatic aloes, an ounce and a half;
- Scammony, half an ounce;
- Lesser cardamom seeds, husked and bruised, one drachm;
- Castile soap, softened with warm water, so as to have a gelatinous consistence, three drachms;
- Water, one pint.

Digest the colocynth in the water, in a covered vessel, with a moderate heat, for four days. To the liquor, expressed and filtered, add the aloes and scammony, separately reduced to powder: then evaporate the mixture to a proper thickness for making pills, having added, towards the end of the evaporation, the soap-jelly and powdered seeds; and mix all the ingredients thoroughly together.

EXTRACTUM HÆMATOXYLI. *Lond.*

Extract of Logwood.

Take of
- Shavings of logwood, one pound;
- Boiling water, one gallon.

Macerate for twenty-four hours, then boil to four pints. Strain the liquor while hot, and evaporate to a proper consistence.

EXTRACTUM OPII AQUOSUM. *Dub.*

Watery Extract of Opium.

Take of
  Opium, two ounces;
  Boiling water, one pint.

Triturate the opium well in the water, for ten minutes; then, after waiting a little, pour off the liquor, and triturate the remaining opium with the same quantity of boiling water, pouring off the infusion in the same manner. This may be repeated a third time. Mix the decanted liquors, and expose the mixture in an open vessel, for two days, to the air. Lastly, filter through linen, and, by slow evaporation, form an extract.

EXTRACTUM OPII. *Lond.*

Extract of Opium.

Take of
  Opium, sliced, half a pound;
  Water, three pints.

Add a small quantity of the water to the opium, and macerate for twelve hours, that it may soften; then, having gradually added the rest of the water, triturate them, until they become thoroughly mixed, and set it at rest until the fæces subside. Then filter the liquor, and evaporate to a proper thickness.

EXTRACTUM PAPAVERIS. *Lond.*

Extract of Poppy.

Take of
  Poppy heads, bruised, one pound;
  Boiling water, a gallon.

Macerate for twenty-four hours; then boilto four pints: strain the liquor while hot, and evaporate to a proper thickness.

EXTRACTUM RHEI. *Lond.*

Extract of Rhubarb.

Take of
  Rhubarb root, in powder, a pound;
  Proof spirit, a pint;
  Water, seven pints.

Macerate, with a gentle heat, for four days; then filter, and set it aside, until the precipitate subside. Pour off the liquor clear, and evaporate to a proper thickness.

EXTRACTUM SARSAPARILLÆ. *Lond.*

Extract of Sarsaparilla.

Take of
  Sarsaparilla root, sliced, a pound;

Boiling water, a gallon.

Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

EXTRACTUM TARAXACI. *Lond.*

Extract of Dandelion.

Take of

Fresh dandelion root, bruised, a pound;

Boiling water, a gallon.

Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

EXTRACTUM VALERIANÆ. *Dub.*

Extract of Valerian.

Take of

Valerian root, in coarse powder, six ounces;

Boiling water, three pints.

Mix and digest, with a moderate heat, twenty-four hours, in a covered vessel; and then express the liquor, which is to be evaporated to a proper thickness.

EXTRACTS MADE WITH ALCOHOL.

EXTRACTUM CINCHONÆ OFFICINALIS. *Ed.*

Extract of Cinchona.

Take of

Cinchona bark, in powder, one pound;

Alcohol, four pounds.

Digest, for four days, and pour off the tincture.

Boil the residuum in five pounds of distilled water, for fifteen minutes, and filter the decoction, boiling hot, through linen. Repeat this decoction and filtration, with the same quantity of distilled water, and reduce the liquor, by evaporation, to the consistence of thin honey.

Draw off the alcohol from the tincture, by distillation, until it also become thick; then mix the liquors, thus inspissated, and evaporate them in a bath of boiling water, saturated with muriate of soda, to a proper consistency.

EXTRACTUM CONVOLVULI JALAPÆ. *Ed.*

Extract of Jalap

Is prepared in the same way, from the bruised root.

EXTRACTUM CINCHONÆ RESINOSUM. *Lond.*

Resinous Extract of Cinchona.

Take of

Lanceleaved cinchona, bruised, one pound;
Rectified spirit of wine, four pints.

Macerate for four days, and strain; distil the tincture, in a water bath, to a proper thickness.

EXTRACTUM CASCARILLÆ RESINOSUM. *Dub.*

Resinous Extract of Cascarilla.

Take of

Cascarilla, in coarse powder, one pound;
Rectified spirit of wine, four pints

Digest for four days; then pour off the tincture, and strain; boil the residuum, in ten pints of water, to two: evaporate the filtered decoction, and distil the tincture, in a retort, till both begin to grow thick; then mix them, and evaporate them to a state fit for making pills. Lastly, they are to be intimately mixed.

In this way are prepared

Extractum	*Resinous Extract of*
Cinchonæ Rubræ Resinosum. *Dub.*	Red Cinchona Bark.
Jalapæ Resinosum. *Dub.*	Jalap.

OPIUM PURIFICATUM. *Dub.*

Purified Opium.

Take of

Opium, cut into small pieces, one pound;
Proof spirit of wine, twelve pints.

Digest the opium with a gentle heat, stirring now and then till it be dissolved, and filter through paper. Distil in a retort until the spirit be separated: pour out the liquor which remains, and evaporate, until the extract acquires a proper thickness.

Purified opium must be kept in two forms; one *soft*, proper for forming into pills; the other *hard*, capable of being reduced into powder.

Lond.

Very carefully separate opium from all heterogeneous matters, especially those adhering to it on the outside. Opium is to be kept in two states, one *soft*, fit for making pills: and another *hard*, dried in a water-bath, until in become pulverizable.

All these extracts are supposed to contain the virtues of the substances from which they are prepared, in a very pure and concentrated form; but this supposition is, probably in several instances, erroneous; and the directions for preparing them are frequently injudicious and uneconomical.

As the changes which opium and aloes undergo by solution, and subsequent evaporation, have never been ascertained by careful and satisfactory experiments, well-selected pieces of these substances are to be preferred to the preparations in which they are supposed to be purified. As a farther proof of the superiority of good opium over all its preparations, I may also remark, that the latter, however well prepared, soon become mouldy, the former never does

Cinchona bark is a medicine of very great importance; but, unfortunately, the proportion of woody fibres, or inert matter, which enter into its composition is so great, that weak stomachs cannot bear it, when given in quantity sufficient to produce any very powerful effects. On this account the preparation of an extract, which may contain its active principles in a concentrated form, is a desirable object. On this subject there is still much room for experiment. The London college, in its late Pharmacopœia, certainly erred in two important particulars; in the first place, in desiring the decoction to be continued until the greatest part of the menstruum is evaporated; and, in the second place, in separating, by filtration, the powder which separates from the decoction after it has cooled. The first error propably originated in the idea, that, by continuing the boiling for a great length of time, more of the bark would be dissolved; but it is now known, that water is incapable of dissolving more than a certain quantity of the active principles of cinchona; and that, after the water has become saturated, by continuing the decoction we diminish the quantity of the menstruum, and therefore also diminish the quantity of bark dissolved. It is not easy to account for the second error; for, according to the old idea, that the powder which separated, on cooling, from a saturated decoction of cinchona, was a resinous substance, it surely ought not to have been rejected from what were supposed to be resinous extracts. This precipitate is now known to be caused by the much greater solubility of its active principles in boiling than in cold water; so that the precipitate is not different from what remains in solution. Accordingly, I ascertained, by experiment, that cinchona gave at least one half more extract when the decoction was conducted according to the directions of the Edinburgh college; and the London college, in their present Pharmacopœia, have improved their processes on the same principles.

The real advantage of so expensive an agent as alcohol, in preparing any of these extracts, has not been demonstrated; and, if I be not misinformed, it is seldom employed by the apothecaries in preparing even what are called the Resinous Extracts.

RESINA FLAVA. *Lond. Dub.*

Yellow Rosin.

This remains in the retort after the distillation of oil of turpentine.

Turpentines are combinations of volatile oil and resins, which are easily separated by distillation. The process, however, cannot be carried so far as to separate the whole of the oil, without charring and burning part of the resin. In this state it has a brown colour, and a certain degree of transparency, and is well known under the name of Fiddlers Rosin. But, if water be added to the residuum of the distillation, and be thoroughly mixed with it by agitation, it becomes opaque, and is called Yellow Rosin.

Yellow rosin is a useful ingredient in the composition of plasters and hard ointments.

GUMMI RESINÆ. *Lond.*

Gum Resins.

Those gum-resins are to be reckoned the best which are selected so pure, that they do not stand in need of purification. But if they seem impure, boil them in water until they grow soft; then squeeze them through a canvas bag, by means of a press. Let it remain at rest till the resinous part subside; then evaporate, in a water-bath, the part of the water decanted off; and, towards the end of the evaporation, mix the resinous part with the gummy into a homogeneous mass.

You may also purify any gum which melts easy by putting it in an ox bladder, and holding it in boiling water till it becomes so soft, that it can be separated from its impurities by pressing it through a hempen cloth.

As one, and perhaps the most active, constituent of gummy resins, as they are called, is of a volatile nature, it is evident that it must be, in a great measure, dissipated in the process just described, and that we cannot expect the same virtues in these substances after they are purified, which they possess in their crude state. This process is, therefore, contrary to the principles of good pharmacy; and such specimens of these gummy resins as stand in need of it to give them an apparent degree of purity, should not be admitted into the shop of the apothecary. Besides, many of the impurities which they usually contain are easily separated, in compounding the preparations or extemporaneous prescriptions into which they enter.

STYRAX PURIFICATA. *Lond.*
Purified Storax.

Dissolve the balsam of storax in rectified spirit of wine, and strain the solution; afterwards reduce the balsam to a proper thickness, by distilling off the spirit with a gentle heat.

Dub.

Digest the storax in water, with a low heat, until it get soft; then express it between iron plates, heated with boiling water; and, lastly, separate it from the water.

STORAX is a balsam, or combination of resin and benzoic acid, both of which are soluble in alcohol, and neither of them volatile in the heat necessary for evaporating alcohol. The London process for purifying it is therefore not liable to any chemical objections. The method now directed by the Dublin college is certainly more economical, but must be attended with loss of benzoic acid.

CHAP XXXVI.—POWDERS.

THIS form is proper for such materials only as are capable of being sufficiently dried to become pulverizable, without the loss of their virtue. There are several substances, however, of this kind, which cannot be conveniently taken in powder; bitter, acrid, fetid drugs are too disagreeable; emollient and mucilaginous herbs and roots are too bulky; pure gums cohere, and become tenacious in the mouth; fixed alkaline salts deliquesce when exposed to the air; and volatile alkalies exhale. Many of the aromatics, too, suffer a great loss of their odorous principles when kept in powder, as in that form they expose a much larger surface to the air.

The dose of powders, in extemporaneous prescription, is generally about half a drachm; it rarely exceeds a whole drachm; and is not often less than a scruple. Substances which produce powerful effects in small doses are not exhibited in this form, unless their bulk be increased by additions of less efficacy; those which require to be given in larger ones are better fitted for other forms.

The usual vehicle for taking the lighter powders, is any agreeable thin liquid. The ponderous powders, particularly those prepared from metallic substances, require a more consistent vehicle, as syrups; for from thin ones they soon subside. Resinous substances likewise are most commodiously taken in thick liquors; for in thin ones they are apt to run into lumps, which are not easily diffused.

IN PULVEREM TRITI. *Dub.*
Powders.

Substances to be powdered, previously dried, are to be pulverized in an iron mortar. The powder is then to be separated, by shaking it through an hair-sieve, and is to be kept in close vessels.

PULVIS ALOES CUM CANELLA. *Dub.*
Powder of Aloes with Cannella.

Take of
Hepatic aloes, one pound;
White canella, three ounces.
Powder them separately, and then mix them.

This was formerly well known by the title of Hiera Picra. The spicy canella acts as a corrigent to the aloes, but the compound is more adapted to be formed into pills, than to be used in the state of powder.

PULVIS ALOES CUM GUAIACO. *Dub.*
Aloetic Powder with Guaiac.

Take of
Hepatic aloes, one ounce and a half;
Gum guaiacum, one ounce;
Aromatic powder, half an ounce.
Rub the aloes and gum guaiacum separately to powder; then mix them with the aromatic power.

PULVIS ALOES COMPOSITUS. *Lond.*
Compound Powder of Aloes.

Take of
Extract of spiked aloes, an ounce and a half;

Gum-resin guaiac, an ounce;
Compound powder of cinnamon, half an ounce.
Powder the aloes and guaiac separately; then mix the compound powder of cinnamon with them.

This powder is supposed to combine the sudorific effects of the guaiac with the purgative of the aloes.

PULVIS AROMATICUS. *Dub.*

Aromatic Powder.

Take of
Cinnamon, two ounces;
Smaller cardamom seeds, husked,
Ginger,
Long pepper, of each one ounce.
Rub them together to a powder.

Edin.

Take of
Cinnamon,
Smaller cardamom seeds,
Ginger, each equal parts.
Reduce them to a very fine powder, which is to be kept in a glass vessel, well closed.

PULVIS CINNAMOMI COMPOSITUS. *Lond.*

Compound Powder of Cinnamon.

Take of
Cinnamon bark, two ounces;
Lesser cardamoms, an ounce and a half;
Ginger, an ounce;
Long pepper, half an ounce;
Reduce them together to a very fine powder.

These compositions are agreeable, hot, and spicy, and may be usefully taken in cold phlegmatic habits, and decayed constitutions, for warming the stomach, promoting digestion, and strengthening the tone of the viscera. The dose is from ten grains to a scruple and upwards. The first and third are considerably the warmest, from the long pepper which they contain.

PULVIS ASARI COMPOSITUS. *Edin.*

Compound Powder of Asarabacca.

Take of
The leaves of asarabacca, three parts;
——— marjoram,

Flowers of lavender, of each one part.
Rub them together to powder.

Dub.

Take of
Dried leaves of asarabacca, one ounce;
Lavender flowers, two drachms.
Powder them, and keep them in a phial, well closed.

These are agreeable and efficacious errhines, and superior to most of those usually sold under the name of *herb snuff*. They are often employed with great advantage in cases of obstinate headach, and of opthalmias resisting other modes of cure. Taken under the form of snuff, to the extent of five or six grains, at bed-time, they will operate the succeeding day as a powerful errhine, inducing frequent sneezing, and likewise a copious discharge from the nose. It is, however, necessary, during their operation, to avoid exposure to cold.

PULVIS CARBONATIS CALCIS COMPOSITUS; olim PULVIS CRETACIUS. *Ed.*

Compound Powder of Carbonate of Lime, formerly *Chalk Powder*.

Take of
Prepared carbonate of lime, four ounces;
Nutmeg, half a drachm;
Cinnamon, one drachm and a half.
Reduce them together to powder.

PULVIS CRETÆ COMPOSITUS. *Lond.*

Compound Powder of Chalk.

Take of
Prepared chalk, half a pound;
Cinnamon, four ounces;
Tormentil,
Gum arabic, of each three ounces;
Long pepper, half an ounce.
Reduce them separately to a very fine powder, and mix them.

THE addition of the aromatic coincides with the general intention of the remedy, which is indicated in weakness and acidity of the stomach, and in looseness from acidity.

PULVIS CRETÆ COMPOSITUS CUM OPIO. *Lond.*

Compound Powder of Chalk with Opium.

Take of
Compound powder of chalk, six ounces and a half;

Hard opium, powdered, four scruples.
Mix them.

The addition of the opium renders this a more powerful remedy than the carbonate of lime alone, especially where the diarrhœa proceeds from irritation of the intestinal canal.

PULVIS CONTRAYERVÆ COMPOSITUS. *Lond.*

Compound Powder of Contrayerva.

Take of
Contrayerva, powdered, five ounces;
Prepared oyster-shells, one pound and a half.
Mix them.

This medicine has a very good claim to the title of an alexipharmic and sudorific. The contrayerva, by itself, proves very serviceable in low fevers, where the vis vitæ is weak, and a diaphoresis to be promoted. It is probable that the carbonate of lime is of no farther service than to divide this active ingredient, and make it sit more easily on the stomach.

PULVIS IPECACUANHÆ ET OPII. *Ed.*

Powder of Ipecacuan and Opium.

Take of
Ipecacuan, in powder,
Opium, of each one part;
Sulphate of potass, eight parts.
Triturate them together into a fine powder.

Pulvis Ipecacuanhæ Compositus. *Lond.*

Compound Powder of Ipecacuan.

Take of
Ipecacuan, in powder,
Hard Opium, in powder, each one drachm;
Sulphate of potass, in powder, an ounce.
Mix them by trituration.

The sulphate of potass, from the grittiness of its crystals, is perhaps better fitted for tearing and dividing the tenacious opium than any other salt; this seems to be its only use in the preparation. The operator ought to be careful that the opium and ipecacuanha be equally diffused through the whole mass of powder, otherwise different portions of the powder must differ in degree of strength.

This powder is one of the most certain sudorifics, and as such was recommended by Dr. Dover, as an effectual remedy in rheumatism. Modern practice confirms its reputation, not only in rheumatism, but also in dropsy, and several other diseases, where it is often difficult, by other means, to produce a copious sweat. The dose is from five to twenty grains, according as the patient's stomach and strength can bear it. It is proper to avoid much drinking immediately after taking it, otherwise it is very apt to be rejected by vomiting before any other effects are produced.

PULVIS JALAPÆ COMPOSITUS. *Ed.*
Compound Powder of Jalap.

Take of
 Jalap root, in powder, one part;
 Super-tartrate of potass, two parts.
Grind them together to a very fine powder.

The use of the tartrate in this preparation is to break down and divide the jalap; and therefore they are directed to be triturated together, and not separately.

PULVIS KINO COMPOSITUS. *Lond.*
Compound Powder of Kino.

Take of
 Kino, fifteen drachms;
 Cinnamon, half an ounce;
 Hard opium, one drachm.
Reduce them separately to a very fine powder, then mix them.

This, though well known in extemporaneous prescription, is a new officinal preparation, and one which promises to be convenient. It is anodyne and astringent, containing one part of opium in twenty.

PULVIS OPIATUS. *Edin.*
Opiate Powder.

Take of
 Opium, one part;
 Prepared carbonate of lime, nine parts;
Rub them together to a fine powder.

PULVIS CORNU CERVI cum OPIO. *Lond.*
Powder of Hartshorn with Opium.

Take of
 Hard Opium, in powder, one drachm;
 Hartshorn, burnt and prepared, an ounce;
 Cochineal, in powder, a drachm.
Mix.

In these powders, the opium is the active ingredient; and it is immaterial whether the phospate or carbonate of lime be used to facilitate its mechanical division.

PULVIS SCAMMONEÆ COMPOSITUS. *Lond.*
Compound Powder of Scammony.

Take of
  Scammony,
  Hard extract of jalap, of each two ounces;
  Ginger, half an ounce.
Powder them separately, and mix them.

Edin.

Take of
  Scammony,
  Super-tartrate of potass, equal parts.
Rub them together to a very fine powder.

In the first of these compositions, the scammony is combined with another purgative more active than itself, and in the other, with one much less so; which difference must be attended to in prescription. The ginger is an useful addition, and will render it less apt to gripe.

PULVIS SENNÆ COMPOSITUS. *Lond.*
Compound Powder of Senna.

Take of
  Senna,
  Super-tartrate of potass, of each two ounces;
  Scammony, half an ounce;
  Ginger, two drachms.
Triturate the scammony by itself, reduce the rest together into a very fine powder, and then mix.

This powder is given as a cathartic, in the dose of two scruples, or a drachm. The scammony is used as a stimulus to the senna; the quantity of the latter necessary for a dose, when not assisted by some more powerful substance being too bulky to be conveniently taken in this form. The ginger is added to make it sit easier on the stomach, and gripe less.

PULVIS SULPHATIS ALUMINÆ COMPOSITUS; olim PULVIS STYPTICUS. *Ed.*
Compound Powder of Sulphate of Alumine, formerly *Styptic Powder.*

Take of
  Sulphate of alumine, four parts;
  Kino, one part.
Rub them together to a fine powder.

This powder is composed of two very powerful astringents, but which we believe are not combined with propriety; at least, it is certain that a solution of alum is decomposed by a solution of kino.

PULVIS TRAGACANTHÆ COMPOSITUS. *Lond.*

Compound Powder of Tragacanth.

Take of
  Tragacanth, powdered,
  Gum arabic powdered,
  Starch, of each an ounce and a half;
  Refined sugar, three ounces.

Powder the starch and sugar together; then add the tragacanth and gum arabic, and mix.

This composition is a mild emollient; and hence becomes serviceable in hectic cases, tickling coughs, strangury, some kinds of alvine fluxes, and other disorders proceeding from a thin acrimonious state of the excreted fluids, or an abrasion of the mucus of the intestines; it is supposed to soften, and give a greater degree of consistency to the former, and defend the latter from being irritated or excoriated by them. All the ingredients coincide in these general intentions. The dose is from half a drachm to two or three drachms, which may be frequently repeated.

Chap. XXXVII.—CONSERVES, ELECTUARIES, AND CONFECTIONS.

Conserves are compositions of recent vegetable matters, and sugar, beaten together into an uniform mass.

This management is introduced for preserving certain simples, undried, in an agreeable form, with as little alteration as possible in their native virtues; and in some cases it is very advantageous. Vegetables, whose virtues are lost or destroyed in drying, may in this form be kept uninjured for a considerable time; for by carefully securing the mouth of the containing vessel, the alteration, as well as dissipation, of their active principles, is generally prevented; and the sugar preserves them from the corruption which juicy vegetables would otherwise undergo.

The sugar should be pounded by itself, and passed through a sieve, before it be mixed with the vegetable mass; for without this it cannot be properly incorporated. Rose buds, and some other vegetables, are prepared for mixing with the sugar by grinding them in a small wooden mill, contrived for that purpose.

There are, however, vegetables whose virtues are impaired by this treatment. Mucilaginous substances, by lying long with sugar, becomes less glutinous; and astringents sensibly become softer upon the palate. Many of the fragrant flowers are of so tender and delicate a texture, as almost entirely to lose their peculiar qualities on being beaten or bruised.

In general, it is obvious, that in this form, on account of the large proportion of sugar, only substances of considerable activity can be taken with advantage as medicines. And, indeed, conserves are at present considered chiefly as auxiliaries to medicines of greater efficacy, or as intermediums for joining them together. They are very convenient for reducing into bolusses or pills the more ponderous powders, as submuriate of mercury, the oxides of iron, and other mineral preparations; which, with liquid or less consistent matters, as syrups, will not cohere.

The shops were formerly encumbered with many conserves, altogether insignificant; the few now retained have in general either an agreeable flavour to recommend them, or are capable of answering some useful purposes, as medicines. Their common dose is the bulk of a nutmeg, or as much as can be taken up at once or twice upon the point of a knife. There is, in general, no great danger of exceeding in this particular.

ELECTUARIES are composed chiefly of powders mixed up with syrups, &c. into such a consistence, that the mass shall neither be too stiff to swallow, nor so thin as to allow the powders to separate, and that a dose may be easily taken up on the point of a knife.

Electuaries are chiefly composed of the milder alterative medicines, and such as are not ungrateful to the palate The more powerful drugs, as cathartics, emetics, opiates, and the like (except in officinal electuaries to be dispensed by weight), are seldom exhibited in this form, on account of the uncertainty of the dose: unpleasant ones, acrids, bitters, fetids, cannot be conveniently taken in it; nor is the form of an electuary well fitted for the more ponderous substances, as mercurials, these being apt to subside on keeping, unless the composition be made very stiff.

The lighter powders require thrice their weight of honey, or of syrup boiled to the thickness of honey, to make them into the consistence of an electuary: of syrups of the common consistence, twice the weight of the powder is sufficient.

Where common syrups are employed the compound is apt to candy and dry too soon; electuaries of Peruvian bark, for instance, made up with syrup alone, will often in a day or two grow too dry for use. This is owing to the crystallization of the sugar. Deyeux, therefore, advises electuaries, confections, and conserves, to be made up with syrups from which all the crystallizable parts have been separated. For this purpose, the syrups after being sufficiently evaporated, are to be exposed to the heat of a stove as long as they form any crystals. What remains, probably from the presence of some vegetable acid, has no tendency to crystallize, and is to be decanted and evaporated to a proper consistence. In hospital practice, the same object may be obtained much more easily by using molasses instead of syrups, and in private practice, by the substitution of a little conserve.

The quantity of an electuary directed at a time in extemporaneous prescription varies much, according to its constituent parts; but is rarely less than the size of a nutmeg, or more than two or three ounces.

CONFECTIO AMYGDALÆ. *Lond.*

Confection of Almonds.

Take of

Sweet almonds, an ounce;
Gum arabic, in powder, a drachm;
Refined sugar, half an ounce;

Having first blanched the almonds, by macerating them in water, and peeling them, beat the whole ingredients into a homogeneous mass.

By triturating this confection with water, we immediately form an almond emulsion, which on many occasions is desirable, as it takes a considerable time to make from the unmixed materials, and soon spoils after it is made.

CONFECTIO AURANTII. *Lond.*

Confection of Orange-peel.

Take of

Fresh orange-peel, grated off, a pound;
Refined sugar, three pounds;

Bruise the peel in a stone mortar with a wooden pestle; then, adding the sugar, beat them into a homogeneous mass.

CONSERVA AURANTII. *Dub.*

Conserve of Orange-peel.

To the rind of Seville oranges, grated off, add three times its weight of refined sugar, while beating it.

CONSERVA CITRI AURANTII. *Ed.*
Conserve of Orange-peel.

Grate off the rind of Seville oranges, beat it into pulp, and while beating it, add gradually three times its weight of double refined sugar.

CONFECTIO ROSÆ CANINÆ. *Lond.*
Confection of Hips.

Take of
Pulp of hips, one pound;
Refined sugar, in powder, twenty ounces.
Triturate them into a homogeneous mass.

Ed.

Beat ripe hips, carefully cleaned from the seeds and down, to a pulp; and, while beating it, gradually add three times its weight of double refined sugar.

CONFECTIO ROSÆ GALLICÆ. *Lond.*
Confection of Red Roses.

Take of
Red rose buds, with the heels cut off, one pound;
Refined sugar.
Beat the petals in a stone mortar; then add the sugar, and reduce the whole to a homogeneous mass.

CONSERVA ROSÆ. *Dub.*
Conserve of Red Roses.

Pluck the petals of red rose buds from the calyces; and having cut off the heels, beat them, gradually adding three times their weight of refined sugar.

CONSERVA ROSÆ GALLICÆ. *Ed.*
Conserve of Red Roses.

Beat the petals of red rose buds to pulp; and add, during the beating, three times their weight of double refined sugar.

LA GRANGE says, that by infusing the red rose leaves in four times their weight of water, and squeezing them out of the infusion, they lose their bitterness, and are more easily reduced to a pulp, which he then mixes with a thick syrup, prepared by dissolving the sugar in the expressed liquor, and boiling it down to the consistence of an electuary.

It is scarcely necessary to make any particular remarks on these conserves. Their taste and virtues are compounded of those of sugar, and the substance combined with it. The wood sorrel and hips are acidulous and refrigerant, the orange-rind and wormwood bitter and stomachic, and the red rose buds astringent.

ELECTUARIUM AROMATICUM. *Ed.*
Aromatic Electuary.

Take of
Aromatic powder, one part;
Syrup of orange-peel, two parts.
Mix and beat them well together, so as to form an electuary.

Dub.

Take of
Cinnamon,
Nutmeg, each half an ounce;
Refined sugar,
Saffron, each one ounce;
Lesser cardamom seeds, husked,
Cloves, each two drachms;
Precipitated chalk, two ounces;
Syrup of orange-peel, a sufficient quantity.
Powder the aromatics separately, then mix with the syrup.

CONFECTIO AROMATICA. *Lond.*
Aromatic Confection.

Take of
Cinnamon,
Nutmeg, of each two ounces;
Cloves, one ounce;
Smaller cardamom seeds, half an ounce;
Saffron, dried, two ounces;
Prepared oyster shells, sixteen ounces;
Refined sugar, two pounds;
Water, a pint.
Reduce the dry substances together to a very fine powder, then gradually add the water, and mix them until they be incorporated.

THESE compositions are sufficiently grateful, and moderately warm. They are given in the form of a bolus, in doses of from five grains to a scruple, or upwards, as a cordial, or as a vehicle for more active substances. The simple composition of the Edinburgh college serves all these purposes as well as the complicated formula of the London college.

ELECTUARIUM CASSIÆ FISTULÆ. *Ed.*

Electuary of Cassia.

Take of
Pulp of cassia fistularis, four parts;
Pulp of tamarinds,
Manna, each one part;
Syrup of pale roses, four parts.

Having beat the manna in a mortar, dissolve with a gentle heat in the syrup; then add the pulps, and evaporate with a regularly continued heat to a proper consistence.

ELECTUARIUM CASSIÆ. *Dub.*

Electuary of Cassia.

Take of
The fresh extracted pulp of cassia, half a pound;
Manna, two ounces;
Pulp of tamarinds, one ounce;
Syrup of orange-peel, half a pound.

Boil the manna, and dissolve it over a slow fire in the syrup; then add the pulp: and, with a continued heat evaporate the whole to the proper thickness of an electuary.

CONFECTIO CASSIÆ. *Lond.*

Confection of Cassia.

Take of
Fresh cassia pulp, half a pound;
Manna, two ounces:
Tamarind pulp, an ounce;
Syrup of roses, half a pint.

Bruise the manna; then dissove it in the syrup, by the heat of a water-bath; lastly, mix in the pulps, and evaporate to a proper thickness.

THESE compositions are very convenient officinals, to serve as a basis for purgative electuaries, and other similar purposes. The tamarinds give them a pleasant acidity, and do not, as might be expected, dispose them to ferment. After standing for four months, the composition has been found no sourer than when first made. This electuary is usually taken by itself, to the quantity of two or three drachms occasionally, for gently loosening the belly in costive habits.

ELECTUARIUM CASSIÆ SENNÆ; olim ELECTUARIUM LENITIVUM. *Ed.*

Electuary of Senna, commonly called *Lenitive Electuary.*

Take of
Senna, eight ounces;

Coriander seeds, four ounces;
Liquorice root, bruised, three ounces;
Figs,
Pulp of prunes, each one pound;
——— tamarinds, half a pound;
Refined sugar, two pounds and a half.

CONFECTIO SENNÆ. *Lond.*
Confection of Senna.

Take of
Senna leaves, eight ounces;
Figs, one pound;
Pulp of tamarinds,
—— of cassia,
—— of prunes, each half pound;
Coriander seeds, four ounces;
Liquorice, three ounces.
Refined sugar, two pounds and a half;

(Powder the senna with the coriander seeds, and sift out ten ounces of the mixed powder; boil the remainder with the figs and liquorice in four pints of water to one half; express and strain the liquor, which is then to be evaporated to about a pint and a half; dissolve the sugar in it; add this syrup by degrees to the pulps; and, lastly, mix in the sifted powder. *Ed. Lond.*)

ELECTUARIUM SENNÆ. *Dub.*
Electuary of Senna.

Take of
Senna leaves, in very fine powder, four ounces;
Pulp of French prunes, one pound;
——— tamarinds, two ounces;
Molasses a pint and a half;
Essential oil of caraway, two drachms.

Boil the pulps in the syrup, to the thickness of honey; then add the powder, and, when the mixture cools, the oil; lastly, mix the whole intimately.

THIS electuary is a very convenient laxative, and has long been in common use among practitioners. Taken to the size of a nutmeg, or more, as occasion may require, it is an excellent laxative for loosening the belly in costive habits. The formula of the Dublin college is much more simple and elegant than the others.

ELECTUARIUM MIMOSÆ CATECHU; olim CONFECTIO JAPONICA. *Ed.*

Electuary of Catechu, commonly called *Japonic Confection.*

Take of
- Extract of mimosa catechu, four ounces;
- Kino, three ounces;
- Cinnamon,
- Nutmeg, each one ounce;
- Opium, diffused in a sufficient quantity of Spanish white wine, one drachm and a half;
- Syrup of red roses, boiled to the consistence of honey, two pounds and a quarter.

Reduce the solids to powder; and having mixed them with the opium and syrup, make them into an electuary.

ELECTUARIUM CATECHU COMPOSITUM. *Dub.*

Compound Electuary of Catechu.

Take of
- Catechu, four ounces;
- Cinnamon, two ounces;
- Kino, three ounces; powder these; then add,
- Hard purified opium, diffused in Spanish white wine, a drachm and a half;
- Syrup of ginger, evaporated to the consistence of honey, two pounds and a quarter.

Mix them.

THESE electuaries, which do not differ in any material particular, are extremely useful astringent medicines, and are often given in doses of a tea spoonful, frequently repeated, in cases of diarrhœa, &c. Ten scruples contain one grain of opium.

CONFECTIO SCAMMONII. *Lond.*

Confection of Scammony.

Take of
- Scammony, in powder, one ounce and a half;
- Cloves, bruised,
- Ginger, in powder, of each six drachms;
- Essential oil of carraway, half a fluidrachm;
- Syrup of roses, as much as is sufficient.

Reduce the dry substances to a very fine powder, add the syrup, and triturate them together, lastly add the oil of caraway, and mix.

Dub.

Take of
- Scammony,

Ginger, of each, in powder, one ounce;
Oil of cloves, one scruple;
Syrup of orange-peel, what is sufficient.
Mix the powdered ginger with the syrup; then add the scammony, and lastly the oil.

This electuary is a warm brisk purgative. A drachm and a half contain fifteen grains of scammony.

ELECTUARIUM OPIATUM; olim ELECTUARIUM THEBAICUM. *Edin.*

Opiate Electuary, commonly called *Thebaic Electuary.*

Take of
Aromatic powder, six ounces;
Virginian snake-root, in fine powder, three ounces;
Opium, diffused in a sufficient quantity of Spanish white wine half an ounce.
Syrup of ginger, one pound.
Mix them, and form an electuary.

CONFECTIO OPII. *Lond.*

Confection of Opium.

Take of
Hard purified opium, powdered, six drachms;
Long pepper, one ounce;
Ginger, two ounces;
Caraway seeds, three ounces;
Syrup, one pint.
Mix the opium with the syrup heated; then add the other ingredients, rubbed to powder, and mix.

The action which these electuaries will produce on the living system, is abundantly apparent from the nature of their ingredients. They are combinations of aromatics with opium; one grain of opium being contained in thirty-six of the London confection, and in forty-three of the Edinburgh electuary.

CONFECTIO RUTÆ. *Lond.*

Confection of Rue.

Take of
Rue leaves, dried,
Caraway seeds,
Laurel berries, of each an ounce and a half;
Sagapenum, half an ounce;
Black pepper, two drachms;

Clarified honey, sixteen ounces

Triturate the dry substances to a very fine powder; then, adding the honey, mix altogether.

THIS was long supposed to be a powerful antihysteric. Its use is now confined to glysters.

CHAP. XXXIX.—TROCHES.

TROCHES and lozenges are composed of powders made up with glutinous substances into little cakes, and afterwards dried. This form is principally made use of for the more commodious exhibition of certain medicines, by fitting them to dissolve slowly in the mouth, so as to pass by degrees into the stomach, or to act upon the pharynx and top of the trachea; and hence these preparations have generally a considerable proportion of sugar, or other materials grateful to the palate. Some powders have likewise been reduced into troches, with a view to their preservation; though possibly for no very good reason; for the moistening, and afterwards drying them in the air, must rather tend to injure than to preserve them. The lozenges of the confectioner are so superior in elegance to those of the apothecary, that they are almost universally preferred; and hence it probably is that the Dublin and London colleges have entirely omitted them.

TROCHISCI CARBONATIS CALCIS. *Ed.*

Troches of Carbonate of Lime.

Take of

Carbonate of lime, prepared, four ounces;
Gum arabic, one ounce;
Nutmeg, one drachm;
Refined sugar, six ounces.

Powder them together, and form them with water into a mass for making troches.

THESE are used against acidity of the stomach, especially when accompanied with diarrhœa.

TROCHISCI GLYCYRRHIZÆ GLABRÆ. *Ed.*

Troches of Liquorice.

Take of

Extract of liquorice.

Gum arabic, each one part;
White sugar, two parts.

Dissolve them in warm water, and strain; then evaporate the solution over a gentle fire, till it be a of a proper consistence for being formed into troches.

THESE are both agreeable pectorals, and may be used at pleasure in tickling coughs. The solution, and subsequent evaporation, of the extract of liquorice, directed by the Edinburgh college, is exceedingly troublesome, and apt to give the troches an empyreumatic flavour. They are more easily made, by reducing the liquorice also to powder, and mixing up the whole with rose-water. Refined extract of liquorice should be used; and it is easily powdered in the cold, after it has been laid for some days in a dry and rather warm place.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. *Ed.*

Liquorice Troches with Opium.

Take of
Opium, two drachms;
Tincture of Tolu, half an ounce;
Common syrup, eight ounces;
Extract of liquorice, softened in warm water,
Gum arabic, in powder, of each five ounces.

Triturate the opium well with the tincture, then add by degrees the syrup and extract; afterwards gradually mix in the powdered gum arabic. Lastly, dry them so as to form a mass, to be divided into troches, each weighing ten grains.

THESE directions for preparing the above troches are so full and particular, that no further explanation is necessary; seven and a half contain about one grain of opium. These troches are medicines of approved efficacy in tickling coughs depending on irritation of the fauces. Besides the mechanical effect of the viscid matters in involving acrid humours, or lining and defending the tender membranes, the opium no doubt must have a considerable effect, by more immediately diminishing the irritability of the parts themselves.

TROCHISCI GUMMOSI. *Ed.*

Gum Troches.

Take of
Gum arabic, four parts;
Starch, one part;
Refined sugar, twelve parts.

Powder them, and make them into a proper mass with rose water, so as to form troches.

This is a very agreeable pectoral, and may be used at pleasure. It is calculated for allaying the tickling in the throat which provokes coughing.

TROCHISCI NITRATIS POTASSÆ *Ed.*

Troches of Nitrate of Potass.

Take of
  Nitrate of potass, one part;
  Double refined sugar, three parts.
Rub together to powder, and form them, with mucilage of gum tragacanth, into a mass, to be divided into troches.

This is a very agreeable form for the exhibition of nitre; though, when the salt is thus taken without any liquid, (if the quantity be considerable), it is apt to occasion uneasiness about the stomach, which can only be prevented by large dilution with aqueous liquors.

Chap. XXXIX.—PILLS.

This form is peculiarly adapted to those drugs which operate in a small dose, and whose nauseous and offensive taste or smell require them to be concealed from the palate.

Pills should have the consistence of a firm paste, a round form, and a weight not exceeding five grains. Essential oils may enter them in small quantity: deliquescent salts are improper. Efflorescent salts, such as carbonate of soda, should be previously exposed to the air until they fall to powder: deliquescent extracts should have some powder combined with them. The mass should be beaten until it become perfectly uniform and plastic. Powders may be made into pills with extracts, balsams, soap, mucilages, bread crumb, &c.

Gum-resins, and inspissated juices, are sometimes soft enough to be made into pills, without addition: where any moisture is requisite, spirit of wine is more proper than syrups or conserves, as it unites more readily with them, and does not sensibly increase their bulk. Light dry powders require syrup or mucilages: and the more ponderous, as the mercurial and other metallic preparations, thick honey, conserve, or extracts.

Light powders require about half their weight of syrup, or about three-fourths their weight of honey, to reduce them into a due consistence for forming pills. Half a drachm of the mass will make five or six pills of a moderate size.

Gums and inspissated juices are to be first softened with the liquid prescribed; the powders are then to be added, and the whole beat thoroughly together, till they be perfectly mixed.

The masses for pills are best kept in bladders, which should be moistened now and then with some of the same kind of liquid that the mass was made up with, or with some proper aromatic oil.

When the mass is to be divided into pills, a given weight of it is rolled out into a cylinder of a given length, and of an equal thickness throughout, and is then divided into a given number of equal pieces, by means of a simple machine. These pieces are then rounded between the fingers; and, to prevent them from adhering, they are covered either with starch, or powder of liquorice, or orris root. In Germany the powder of lycopodium is much used.

PILULÆ ALOETICÆ. *Ed.*
Aloetic Pills.

Take of
Aloes, in powder,
Soap, equal parts.
Beat them with simple syrup into a mass fit for making pills.

PILULÆ ALOES CUM ZINGIBERE. *Dub.*
Pills of Aloes and Ginger.

Take of
Hepatic aloes, one ounce;
Ginger root, in powder, one drachm;
Soap, half an ounce;
Essence of peppermint, half a drachm.
Powder the aloes with the ginger, then add the soap and the oil, so as to form an intimate mixture.

PILULÆ ALOES COMPOSITÆ. *Lond.*
Compound Pills of Aloes.

Take of
Socotorine aloes, powdered, one ounce;
Extract of gentian, half an ounce;
Oil of caraway seeds, forty minims;
Syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

ALTHOUGH soap can scarcely be thought to facilitate the solution of the aloes in the stomach, as was supposed by Boerhaave and others, it is, probably, the most convenient substance than can be added, to give it the proper consistence for making pills. When extract of gentian is triturated with aloes, they re-act upon each other, and become too soft to form pills, so that the addition of any syrup to the mass, as directed by the

London college, is perfectly unnecessary; unless, at the same time, some powder be added to give it consistency.

Aloetic pills are much used as warm and stomachic laxatives; they are very well suited for the costiveness so often attendant on people of sedentary lives, and, upon the whole, are one of the most useful articles in the materia medica.

PILULÆ ALOES ET ASSÆ FŒTIDÆ. *Ed.*

Pills of Aloes and Assafœtida.

Take of
Socotorine aloes, in powder,
Assafœtida,
Soap, equal parts.
Form them into a mass, with mucilage of gum arabic.

These pills, in doses of about ten grains, twice a-day, produce the most salutary effects in cases of dyspepsia, attended with flatulence and costiveness.

PILULÆ ALOES CUM COLOCYNTHIDE. *Ed.*

Pills of Aloes with Colocynth.

Take of
Socotorine aloes,
Scammony, of each eight parts;
Colocynth, four parts;
Oil of cloves,
Sulphate of potass with sulphur, of each one part.
Reduce the aloes and scammony into a powder, with the salt; then let the colocynth, beat into a very fine powder, and the oil, be added: lastly, make it into a proper mass with mucilage of gum arabic.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. *Dub.*

Compound Pills of Colocynth.

Take of
Pith of colocynth, half an ounce;
Hepatic aloes,
Scammony, each one ounce;
Castile soap, two drachms;
Oil of cloves, one drachm.
Powder the aloes, scammony, and colocynth, separately; then triturate them with the soap and the oil, and form them into a mass with simple syrup.

This is more powerful in its operation than the simple aloetic pills.

PILULÆ ALOES ET MYRRHÆ *Ed.*
Pills of Aloes and Myrrh.

Take of
Socotorine aloes, four parts;
Myrrh, two parts;
Saffron, one part.
Beat them into a mass with simple syrup.

Dub.

Take of
Hepatic aloes, one ounce;
Myrrh, half an ounce;
Saffron, in powder, two drachms;
Essential oil of caraway, half a drachm;
Syrup, a sufficient quantity.
Powder the aloes and myrrh separately, then mix the whole intimately together.

PILULÆ ALOES CUM MYRRHA. *Lond.*
Pills of Aloes with Myrrh.

Take of
Socotorine aloes, two ounces:
Myrrh,
Saffron, of each one ounce;
Syrup, as much as is sufficient.
Powder the aloes and myrrh separately; and, afterwards, beat all the ingredients together into a homogeneous mass.

THESE pills have long continued in practice, without any other alteration than in the syrup with which the mass is made up, and in the proportion of saffron. The virtues of this medicine may be easily understood from its ingredients. Given to the quantity of half a drachm, or two scruples, they prove considerably cathartic, but they answer much better purposes in smaller doses as laxatives or alteratives.

PILULÆ ASSÆ FŒTIDÆ COMPOSITÆ. *Ed.*
Compound Pills of Assafœtida.

PILULÆ MYRRHÆ COMPOSITÆ *Dub.*
Compound Pills of Myrrh.

Take of
Assafœtida,
Galbanum,
Myrrh, each eight parts (one ounce, *Dub.*);
Rectified oil of amber, one part, (half a drachm *Dub.*).
Beat them into a mass with simple syrup.

PILULÆ GALBANI COMPOSITÆ. *Lond.*
Compound Pills of Galbanum.

Take of
Galbanum, an ounce;
Myrrh,
Sagapenum, of each one ounce and a half:
Assafœtida, half an ounce;
Syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

These pills are designed for anti-hysterics and emmenagogues, and are very well calculated for answering those intentions; half a scruple, a scruple, or more, may be taken every night, or oftener. It is singular, that each of the colleges should have given them different names. The assafœtida is certainly the most powerful article.

PILULÆ GAMBOGIÆ COMPOSITÆ *Lond.*
Compound Pills of Gamboge.

Take of
Gamboge, in powder,
Socotorine aloes, in powder,
Compound powder of cinnamon, of each one drachm;
Soap, two drachms.
Mix the powders, then add the soap, and beat the whole into a homogeneous mass.

This is a very useful purgative pill, being considerably more active than aloes alone.

PILULÆ AMMONIARETI CUPRI. *Ed.*
Pills of Ammoniaret of Copper.

Take of
Ammoniaret of copper, in fine powder, sixteen grains;
Bread crumb, four scruples;
Water of carbonate of ammonia, as much as may be sufficient.
Beat them into a mass, to be divided into thirty-two equal pills.

Each of these pills weighs about three grains, and contains somewhat more than half a grain of the ammoniaret of copper. They seem to be the best form of exhibiting this medicine.

PILULÆ FERRI CUM MYRRHÆ. *Lond.*
Pills of Iron with Myrrh.

Take of
Myrrh in powder, two drachms;
Subcarbonate of soda,
Sulphate of iron,
Sugar, of each a drachm.

Powder the myrrh with the subcarbonate of soda; then having added the sulphate of iron, rub them again; then beat the whole, mixed together, into a homogeneous mass.

THIS is Griffith's mixture in a solid form, and may often be convenient.

PILULÆ HYDRARGYRI. *Ed.*
Mercurial Pills.

Take of
Purified quicksilver,
Conserve of red roses, of each one ounce;
Starch, two ounces.

Triturate the quicksilver with the conserve, in a glass mortar, till the globules completely disappear, adding, occasionally, a little mucilage of gum arabic; then add the starch, and beat the whole with a little water into a mass, which is to be immediately divided into four hundred and eighty equal pills.

Lond. Dub.

Take of
Purified quicksilver, two drachms;
Conserve of roses, three drachms;
Liquorice root, finely powdered, one drachm.

Rub the quicksilver with the conserve until the globules disappear; then, adding the liquorice powder, mix them together, into a homogeneous mass.

THE common mercurial pill is one of the best preparations of mercury, and may, in general, supersede most other forms of this medicine. In this preparation the mercury is minutely divided, and, probably, converted into the black oxide. To effect its mechanical division, it must be triturated with some viscid substance. Soap, resin of guaiac, honey, extract of liquorice, manna, and conserve of roses, have all been, at different times, recommended. The soap and guaiac have been rejected on account of their being decomposed by the juices of the stomach; and the honey, because it was apt to gripe some people. With regard to the others, the grounds of selection are not well understood; perhaps the acid contained in the conserve of roses may contribute to the extinction of the mercury. The mercury is most easily known to be completely extinguished, if no globules appear, on rubbing a very little of the mass with the point of the finger on a piece of paper. As soon as this is the case, it is necessary to mix with the mass a proportion of some dry powder, to give it a proper degree of consistency. For this purpose, powder of liquorice root has been commonly used; but it is extremely apt to become mouldy, and to cause the pills to spoil. The Edinburgh college have, therefore, with great propriety, substituted for it starch, which is a very inalterable substance, and easily procured, at all times, in a state of purity. It is necessary to form the mass into pills immediately, as it soon becomes hard. One grain of mercury is contained in four grains of the Edinburgh mass, and in three of the London and Dublin. The dose of these pills must be regulated by circumstances; from two to six five-grain pills may be given daily.

PILULÆ HYDRARGYRI SUBMURIATIS. *Lond.*

Pills of Submuriate of Mercury.

Take of
Submuriate of quicksilver,
Precipitated sulphurate of antimony, of each one drachm;
Guaiac, in powder, two drachms.
Triturate the submuriate with the sulphuret of antimony, and then with the guaiac; and add as much copaiba as will give the mass a proper consistence.

These pills were recommended to the attention of the public, about forty years ago by Dr. Plummer, whose name they long bore. He represented them, in a paper which he published in the Edinburgh Medical Essays, as a very useful alterative; and on his authority they were at one time much employed; but they are now less extensively used than formerly.

PILULÆ SAPONIS CUM OPI. *Lond.*

Pills of Soap with Opium.

Take of
Hard opium, in powder, half an ounce;
Hard Soap, two ounces.
Beat them into a homogeneous mass.

PILULÆ E STYRACE. *Dub.*

Storax Pills.

Take of
Purified storax, three drachms;
Soft purified opium,
Saffron, of each one drachm.
Beat them into an uniform mass.

PILULÆ OPIATÆ; olim PILULÆ THEBAICÆ. *Ed.*

Opiate, or Thebaic Pills.

Take of
Opium, one part;

Extract of liquorice, seven parts;
Jamaica pepper, two parts.

Soften the opium, and extract separately with diluted alcohol; and having beat them into a pulp, mix them: then add the pepper reduced to a powder: and, lastly, having beat them well together, form the whole into a mass.

It is unfortunate that these compositions should differ so much in strength, the first containing one grain of opium in three, the second one in five, and the last only one grain of opium in ten of the mass. Under the idea that opium is to operate as a sedative, the addition of the pepper is somewhat injudicious. The title adopted by the Edinburgh college is ambiguous, as it may be mistaken for pills of opium, without any addition. That of the Dublin college is better, although it does not mention the only active ingredient, as it is often necessary to conceal from our patients that we are giving them opium, which both the name and smell of the storax enable us to do But that of the London college is upon the whole perhaps the best.

PILULÆ RHEI COMPOSITÆ. *Ed.*

Compound Pills of Rhubarb.

Take of
Rhubarb, in powder, one ounce;
Socotorine aloes, six drachms;
Myrrh, half an ounce;
Volatile oil of peppermint, half a drachm.

Make them into a mass, with a sufficient quantity of syrup of orange-peel.

This pill is intended for moderately warming and strengthening the stomach, and gently opening the belly. A scruple of the mass may be taken twice a-day.

PILULÆ SCILLÆ COMPOSITÆ. *Lond.*

Compound Squill Pills.

Take of
Fresh dried squills, powdered, one drachm;
Ginger, powdered,
Hard soap, of each three drachms;
Ammoniacum, in powder, two drachms.

Mix the powders together, then beat them with the soap, with the addition of as much syrup as will give them a proper consistence.

PILULÆ SCILLÆ CUM ZINGIBERE. *Dub.*

Squill Pills with Ginger.

Take of
Powder of squills, one drachm;

Ginger, in fine powder, two drachms;
Essential oil of aniseed, ten drops.
Triturate together, and form into a mass with jelly of soap.

PILULÆ SCILLITICÆ. *Ed.*
Squill Pills.

Take of
Dried root of squills, in fine powder, one scruple;
Gum ammoniac,
Lesser cardamom seeds, in powder,
Extract of liquorice, each one drachm.
Form them into a mass with simple syrup.

THESE are elegant and commodious forms for the exhibition of squills, whether for promoting expectoration, or with the other intentions to which that medicine is applied. As the virtue of the compound is derived chiefly from the squills, the other ingredients are often varied in extemporaneous prescription,

CHAP. XL.—CATAPLASMS.

CATAPLASMA FERMENTI. *Lond.*
Yeast Cataplasm.

Take of
Flour, one pound;
Beer yeast half a pint.
Mix and expose to a gentle heat, till it begin to swell.

The yeast excites fermentation in the flour, and converts the whole into a thin dough. This cataplasm is considered as a very efficacious application to putrid or putrescent ulcers or tumours.

CATAPLASMA SINAPEOS. *Dub.*
Mustard Cataplasm.

Take of
Mustard seed, powdered,
Crumb of bread, of each half a pound;
Vinegar, as much as is sufficient.
Mix, and make a cataplasm.

Sinapisms may be made stronger, by adding of
Horse-radish, scraped, two ounces.

CATAPLASMA SINAPIS. *Lond.*
Mustard Cataplasm.

Take of
Mustard seed,
Linseed, of each, in powder, half a pound;
Warm vinegar, as much as may be sufficient.
Mix to the thickness of a cataplasm.

CATAPLASMS of this kind are commonly known by the name of *Sinapisms.* They were formerly frequently prepared in a more complicated state, containing garlic, black soap, and other similar articles; but the above simple form will answer every purpose which they are capable of accomplishing. They are employed only as stimulants; they often inflame the part, and raise blisters, but not so perfectly as cantharides. They are frequently applied to the soles of the feet, in the low state of acute diseases, for raising the pulse, and relieving the head. The chief advantage they have depends on the suddenness of their action.

CHAP. XLI.—LINIMENTS, OINTMENTS, CERATES, AND PLASTERS.

THESE are all combinations of fixed oil, or animal fat, with other substances, and differ from each other only in consistence. Deyeux has, indeed, lately defined plasters to be combinations of oil with metallic oxides; but as this would comprehend many of our present ointments, and exclude many of our plasters, we shall adhere to the old meaning of the terms.

Liniments are the thinnest of these compositions, being only a little thicker than oil.

Ointments have generally a degree of consistence like that of butter.

Cerates are firmer, and contain a larger proportion of wax.

Plasters are the most solid, and when cold, should be firm, and should not adhere to the fingers; but when gently heated, should become sufficiently soft to spread easily, and should then adhere to the skin. Plasters derive their firmness, either from a large proportion of wax, rosin, &c. or from the presence of some metallic oxide, such as that of lead.

Plasters should have such a consistence as not to adhere to the fingers when cold, but become soft and plastic when gently heated. The heat of the body should render it tenacious enough to adhere to the skin, and to the substance on which it is spread. When prepared, they are usually formed into rolls, and inclosed in paper. Plasters of a small size are often spread on leather, sometimes on strong paper, or tin foil, by means of a spatula gently heated, or the thumb. The leather is cut of the shape wanted, but somewhat larger; and the margin all round, about $\frac{1}{4}$ inch in breadth is left uncovered, for its more easy removal when necessary. Linen is also used, especially for the less active plasters, which are used as dressings, and often renewed. It is generally cut into long slips of various breadths, from one to six inches. These may either be dipt into the melted plaster, and passed through two pieces of straight and smooth wood, held firmly together, so as to remove any excess of plaster; or, what is more elegant, they are spread on one side only, by stretching the linen, and applying the plaster, which has been melted and allowed to become almost cold, evenly by means of a spatula, gently heated, or, more accurately, by passing the linen on which the plaster has been laid, through a machine formed of a spatula fixed, by screws, at a proper distance from a plate of polished steel.

To prevent repetition, the Edinburgh college give the following canon for the preparation of these substances.

In making these compositions, the fatty and resinous substances are to be melted with a gentle heat, and then constantly stirred, adding, at the same time, the dry ingredients, if there be any, until the mixture, on cooling, becomes stiff.

The Dublin college prefixes the following direction.

Tutty and calamine employed in making ointments, are prepared in the same manner as chalk.

In making ointments and plasters, the wax, resins, and fats, are to be melted with a moderate heat, then removed from the fire, and constantly stirred, until they cool, adding at the same time, the dry ingredients, if there be any, in very fine powder.

SEVUM PREPARATUM. *Lond.*

Prepared Mutton Suet.

Cut it into pieces, melt it over a slow fire and express through linen.

ADEPS PRÆPARATA. *Lond.*

Prepared Hog's Lard

Cut it into pieces, melt it over a slow fire; and strain it by expression through linen.

ADEPS SUILLUS PRÆPARATUS. *Dub.*

Prepared Hog's Lard.

Melt lard, cut in pieces, with a moderate heat, and strain it with expression through flannel.

Lard, which is purified by those who sell it, and which is preserved with salt, is to be melted with twice its weight of boiling water, and the mixture well agitated. Set it aside until it cool, and then separate the fat.

BEFORE proceeding to melt these fats, it is better to separate as much of the membranes as possible, and to wash them in repeated quantities of water until they no longer give out any colour. Over the fire they will be perfectly transparent, and, if they do not crackle on throwing a few drops into the fire, it is a sign that all the water is evaporated, that the fats are ready for straining, which should be done through a linen cloth without expression. The residuum may be repeatedly melted with a little water, until it become discoloured with the fire. The fluid fat should be poured into the vessels, or bladders, in which it is to be preserved.

These articles had formerly a place also among the preparations of the Edinburgh college. But now they introduce them only into their list of the materia medica; as the apothecary will, in general, find it more for his interest to purchase them thus prepared, than to prepare them for himself; for the process requires to be very cautiously conducted, to prevent the fat from burning or turning black.

CERA FLAVA PURIFICATA. *Dub.*

Purified Yellow Wax.

Take of

Yellow wax, any quantity.

Melt it with a moderate heat, remove the scum, and after allowing it to settle, pour it cautiously off from the fæces.

YELLOW wax is so often adultered, that this process is by no means unnecessary.

LINIMENTUM SIMPLEX. *Ed.*

Simple Liniment.

Take of

Olive oil, four parts;
White wax, one part.

This consists of the same articles which form the Unguentum simplex of the Edinburgh pharmacopœia, but merely in a different proportion, so as to render the composition thinner; and where a thin consistence is requisite, this may be considered as a very elegant and useful application.

UNGUENTUM SIMPLEX. *Ed.*

Simple Ointment.

Take of
Olive oil, five parts;
Whitewax, two parts.

Both these ointments may be used for softening the skin and healing chaps.

UNGUENTUM CETACEI. *Lond.*

Ointment of Spermaceti.

Take of
Spermaceti, six drachms;
White wax, two drachms;
Olive oil, three fluidounces.
Melt them together over a slow fire, stir them constantly until they be cold.

Unguentum Spermatis Ceti. *Dub.*

Ointment of Spermaceti.

Take of
White wax, half a pound;
Spermaceti, one pound;
Prepared hogs lard, three pounds.
Make into an ointment.

This had formerly the name of *Linimentum album*, and it is perhaps only in consistence that it can be considered as differing from the unguentum simplex, already mentioned, or the ceratum simplex, afterwards to be taken notice of.

CERATUM SIMPLEX. *Ed.*

Simple Cerate.

Take of
Olive oil, six parts;
White wax, three parts;
Spermaceti, one part.

CERATUM CETACEI. *Lond.*

Cerate of Spermaceti.

Take of
Spermaceti, half an ounce;

White wax, two ounces;
Olive oil, four fluidounces.
Add the oil to the wax and spermaceti, melted together, and stir until the cerate be cold.

THIS had formerly the name of *Ceratum album*, and it differs in nothing from the Unguentum spermacetis ceti, or Linimentum album, as it was formerly called, excepting in consistence, both the wax and the spermaceti bearing a greater proportion to the oil.

CERATUM. *Lond.*
Cerate.

Take of
Olive oil, four fluidounces;
Yellow wax, four ounces.
Add the oil to the melted wax, and mix.

UNGUENTUM CERÆ FLAVÆ. *Dub.*
Ointment of Yellow Wax.

Take of
Purified yellow wax, a pound;
Prepared hogs lard, four pounds.
Make into an ointment.

UNGUENTUM CERÆ ALBÆ. *Dub.*
Ointment of White Wax

Is prepared in the same manner, with white wax, instead of yellow.

CERATUM RESINÆ. *Lond.*
Cerate of Resin.

Take of
Yellow resin,
Yellow wax, of each one pound;
Olive oil, one pint.
Melt the resin and wax together with a slow fire; then add the oil, and strain the mixture, while hot, through linen.

UNGUENTUM RESINOSUM. *Ed.* UNGUENTUM RESINÆ ALBÆ. *Dub.*
Resinous Ointment. Ointment of White Resin.

Take of
Hogs lard, eight parts (four pounds, *Dub.*);
White resin, five parts (two pounds, *Dub.*);
Yellow wax, two parts (one pound, *Dub.*).
(Make into an ointment, which is to be strained while hot, through a sieve, *Dub.*)

These are commonly employed in dressings, for digesting, cleansing, and incarnating wounds and ulcers.

CERATUM RESINÆ. *Lond.*
Cerate of Resin.

Take of
  Ointment of yellow resin, half a pound;
  Yellow wax, one ounce.
Melt them together, and make a syrup.

This had formerly the name of *Unguentum citrinum.* It is no otherwise different from the yellow basilicum, or Unguentum resinæ flavæ, than being of a stiffer consistence, which renders it for some purposes more commodious.

EMPLASTRUM CERÆ. *Lond.*
Wax Plaster.

Take of
  Yellow wax,
  Prepared mutton suet, of each three pounds;
  Yellow resin, one pound.
Melt them together, and strain.

EMPLASTRUM SIMPLEX, OLIM EMPLASTRUM CEREUM. *Ed.*
Simple or *Wax Plaster.*

Take of
  Yellow wax, three parts;
  Mutton suet,
  White resin, each two parts.

This is chiefly used to support the discharge from a part which has been blistered, and was therefore formerly called *Emplastrum attrahens.* Sometimes, however, it irritates too much, on account of the resin; and hence, when designed only for dressing blisters, the resin ought to be entirely omitted, unless where a continuance of the pain and irritation, excited by the visicatory, is required. Indeed, plasters of any kind are not very proper for dressing blisters; their consistence makes them sit uneasy, and their adhesiveness renders the taking them off painful. Cerates, which are softer and less adhesive, appear much more eligible: the Ceratum spermatis ceti will serve for general use; and for some particular purposes, the Ceratum resinæ flavæ may be applied.

UNGUENTUM ELEMI. *Dub.*
Ointment of Elemi.

Take of
  Resin of elemi, one pound;
  White wax, half a pound;
  Prepared hogs lard, four pounds.
Make into an ointment, to be strained through a sieve while hot.

UNGUENTUM ELEMI COMPOSITUM. *Lond.*
Compound Ointment of Elemi.

Take of
  Elemi, one pound;
  Turpentine, ten ounces;
  Mutton suet, prepared, two pounds;
  Olive oil, two fluidounces.
Melt the elemi with the suet; and having removed it from the fire, mix it immediately with the turpentine and oil; after which strain the mixture through linen.

THIS ointment, formerly known by the name of *Linimentum Arcæi*, has long been used for digesting, cleansing, and incarnating; and, for these purposes, is preferred by some surgeons to all the other compositions of this kind, probably because it is more expensive.

UNGUENTUM PICIS. *Dub.*
Tar Ointment.

Take of
  Tar,
  Mutton suet, prepared, of each half a pound.
Melt them together, and strain.

Ed.

Take of
  Tar, five parts;
  Yellow wax, two parts.

UNGUENTUM PICIS LIQUIDÆ. *Lond.*
Ointment of Tar.

Take of
  Tar,
  Prepared suet, of each a pound.
Melt them together, and strain through linen.

THESE compositions cannot be considered as differing essentially from each other. As far as they have any peculiar activety, this entirely depends on the tar. From the empyreuma-therefore it is customary, after the blister is spread, to cover its surface with powdered cantharides. The effect is also more speedy and certain, if the part to which it is to be applied be well bathed with hot vinegar; and it is more easily removed if a bit of thin gauze be interposed between it and the skin.

EMPLASTRUM PICIS COMPOSITUM. *Lond.*

Compound Pitch Plaster.

Take of
- Burgundy pitch, two pounds;
- Frankincense, one pound;
- Yellow resin,
- Yellow wax, of each four ounces;
- Expressed oil of mace, one ounce.

To the pitch, resin, and wax, melted together, add first the frankincense, and then the oil of mace.

UNGUENTUM PICIS ARIDÆ. *Lond.*

Ointment of Burgundy Pitch.

Take of
- Burdundy pitch,
- Yellow wax,
- Yellow resin, of each nine ounces;
- Olive oil, a pint.

Melt together, and express through linen.

EMPLASTRUM CUMINI. *Lond.*

Cummin Plaster.

Take of
- Cummin seeds,
- Caraway seeds,
- Bay berries, of each three ounces;
- Burgundy pitch, three pounds;
- Yellow wax, three ounces.

Melt the pitch and wax together, and mix with them the rest of the ingredients, powdered, and make a plaster.

THIS plaster has been recommended as a moderately warm discutient; and is directed by some to be applied to the hypogastric region, for strengthening the viscera, and expelling flatulencies.

EMPLASTRUM AROMATICUM *Dub.*

Aromatic Plaster.

Take of
- Frankincense, three ounces;
- Yellow wax, half an ounce;

Cinnamon, in powder, six drachms;
Essential oil of pimento,
——————— lemon, each two drachms.

Melt the frankincense and wax together, and strain; when getting stiff, from being allowed to cool, mix in the cinnamon and oils, and make a plaster.

THIS has been considered as a very elegant stomach plaster. It is contrived so as to be easily made accasionally, (for these kinds of compositions, on account of their volatile ingredients, are not fit for keeping), and to be but moderately adhesive, so as not to offend the skin, and that it may, without difficulty, be frequently renewed; which these sorts of applications, in order to their producing any considerable effect, require to be.

UNGUENTUM SAMBUCI. *Lond.*

Elder Ointment.

Take of
Elder flowers, two pounds;
Prepared lard, two pounds;

Boil the flowers in the lard, till they become crisp; then strain with expression.

Dub.

Take of
Fresh elder flowers, three pounds;
Prepared hogs lard, four pounds;
Mutton suet, two pounds.

Boil the flowers in the lard, until they become crisp; then strain with expression; lastly, add the suet, and melt them together.

COMPOSITIONS of this kind were formerly very frequent; but vegetables, by boiling in oils, impart to them nothing but a little mucilage, which changes the greasy oils to drying oils, and any resin they may contain; but that also is never in such quantity as to effect the nature of the oil. We, therefore, do not suppose that this ointment possesses any properties different from a simple ointment of the same consistence, except its fragrancy.

UNGUENTUM INFUSI MELOES VESICATORII; vulgo UNGUENTUM EPISPASTICUM MITIUS. *Ed.*

Ointment of Infusion of Cantharides, commonly called *Milder Epispastic Ointment.*

Take of
Cantharides,

White resin,
Yellow wax, each one part;
Hogs lard,
Venice turpentine, each two parts;
Boiling water, four parts.

Macerate the cantharides in the water for a night; then strongly press out and strain the liquor, and boil it with the lard till the water be consumed: then add the resin and wax; and, when these are melted, take the ointment off the fire, and add the turpentine.

THESE ointments, containing the soluble parts of the cantharides, uniformly blended with the other ingredients, are more commodious, and in general occasion less pain, though little less effectual in their action, than the compositions with the fly in substance. A very good stimulating liniment is composed by melting one part of this with half a part of camphor in powder, and three parts of turpentine.

UNGUENTUM PULVERIS MELOES VESICATORII; olim UNGUENTUM EPISPASTICUM FORTIUS. *Ed.*

Ointment of the Powder of Spanish Flies, formerly *Stronger Epispastic Ointment.*

Take of
Resinous ointment, seven parts;
Powdered cantharides, one part.

UNGUENTUM CANTHARIDUM *Dub.*

Ointment of Spanish Flies.

Take of
Ointment of yellow wax, half a pound;
Spanish flies, in powder, an ounce.
Make into an ointment.

THIS ointment is employed in the dressings for blisters, intended to be made *perpetual*, as they are called, or to be kept running for a considerable time, which, in many chronic, and some acute cases, is of great service. Particular care should be taken, that the cantharides employed in these compositions be reduced into very subtile powder, and that the mixtures be made as equal and uniform as possible.

CERATUM LYTTÆ. *Lond.*

Cerate of Cantharides.

Take of
Cerate of spermaceti, six drachms;
Spanish flies, finely powdered, one drachm.

Add the flies to the cerate, softened with heat, and mix.

THIS is also an issue ointment, of a considerably firmer consistency then either of the former.

EMPLASTRUM LYTTÆ. *Lond.*

Plaster of Spanish Flies.

Take of
  Spanish flies, finely powdered, one pound;
  Wax plaster, one pound and a half;
  Prepared hogs lard, a pound.

Having melted the plaster and lard together, and removed them from the fire, sprinkle in the flies, a little before they become firm, and mix the whole together.

EMPLASTRUM CANTHARIDIS. *Dub.*

Plaster of Spanish Flies.

Take of
  Purified yellow wax,
  Mutton suet, each one pound;
  Yellow resin, four ounces;
  Cantharides, in fine powder, one pound.

To the wax and suet melted together, a little before they stiffen, on being allowed to cool, mix in the cantharides, and form an ointment.

EMPLASTRUM MELOES VESICATORII; olim EMPLASTRUM VESICATORIUM. *Ed.*

Plaster of Spanish Flies, formerly *Blistering Plaster.*

Take of
  Mutton suet,
  Yellow wax,
  White resin,
  Cantharides, each equal weights.

Mix the cantharides, reduced to a fine powder, with the oth ingredients, previously melted, and removed from the fire.

IN making these plasters, from an incautious application of heat, the cantharides sometimes lose their vesicating powers; therefore it is customary, after the blister is spread, to cover its surface with powdered cantharides. The effect is also more speedy and certain, if the part to which it is to be applied be well bathed with hot vinegar; and it is more easily removed if a bit of thin gauze be interposed between it and the skin.

EMPLASTRUM CALEFACIENS. *Dub.*

Calefacient Plaster.

Take of
  Plaster of cantharides, one part;

Burgundy pitch, seven parts.
Melt together, at a moderate heat, and make into a plaster.

This is a very convenient plaster, being more active as a stimulant and rubefacient than the simple Burgundy pitch plaster, while it will scarcely ever raise a blister.

EMPLASTRUM MELOES VESICATORII COMPOSITUM. *Ed.*

Compound Plaster of Spanish Flies.

Take of
Burgundy pitch,
Venice turpentine,
Cantharides, each twelve parts;
Yellow wax, four parts;
Sub-acetite of copper, two parts;
Mustard seed,
Black pepper, each one part.
Having first melted the pitch and wax, add the turpentine, and to these, in fusion, and still hot, add the other ingredients, reduced to a fine powder, and mixed, and stir the whole carefully together, so as to form a plaster.

This is supposed to be the most infallible blistering plaster. It certainly contains a sufficient variety of stimulating ingredients.

UNGUENTUM PIPERIS NIGRI *Dub.*

Ointment of Black Pepper.

Take of
Prepared lard, one pound;
Black pepper, in powder, four ounces.
Make into an ointment.

This is stimulating and irritating.

UNGUENTUM VERATRI. *Lond.*

Ointment of White Hellebore.

Take of
White hellebore root, in powder, two ounces;
Prepared hogs lard, eight ounces;
Essence of lemon, twenty minims.
Mix.

UNGUENTUM HELLEBORI ALBI. *Dub.*

Ointment of White Hellebore.

Take of
Prepared hogs lard, one pound;

White hellebore root, in powder, three ounces.
Make into an ointment.

This is recommended in the itch, and other cutaneous affections.

UNGUENTUM SABINÆ. *Dub.*

Savine Ointment.

Take of
Fresh savine leaves, separated from the stalks, and bruised, half a pound;
Prepared hogs lard, two pounds;
Yellow wax, half a pound.
Boil the leaves in the lard until they become crisp; then filter with expression; lastly, add the wax, and melt them together.

CERATUM SABINÆ *Lond.*

Cerate of Savine.

Take of
Fresh savine leaves, bruised, one pound;
Yellow wax, half a pound;
Prepared hogs lard, two pounds.
Boil the savine leaves with the lard and wax melted together; and express through linen.

This is an excellent issue ointment, being, in many respects, preferable to those of cantharides. If fresh leaves are not to be had, it may be made by mixing the dried leaves, finely powdered, with any ointment of proper consistency.

UNGUENTUM SULPHURIS. *Lond.*

Sulphur Ointment.

Take of
Prepared lard, half a pound;
Sublimed sulphur, three ounces;
Mix.

Edin.

Take of
Hogs lard, four parts;
Sublimed sulphur, one part;

To each pound of this ointment, add
Volatile oil of lemons, or
———— lavender, half a drachm

Dub.

Take of
  Prepared lard, four pounds;
  Sublimed sulphur, one pound.
Make an ointment.

Unguentum Sulphuris Compositum. *Lond.*
Compound Sulphur Ointment.

Take of
  Sublimed sulphur, half a pound;
  White hellebore root, in powder, two ounces;
  Nitrate of potass, a drachm;
  Soft soap, half a pound;
  Prepared lard, a pound and a half.
Mix.

Sulphur is a certain remedy for the itch, more safe than mercury. A pound of ointment serves for four unctions. The patient is to be rubbed every night, a fourth part of the body at each time. Though the disease may be thus cured by a single application, it is in general advisable to touch the parts most affected for a few nights longer, and to conjoin with the frictions the internal use of sulphur.

UNGUENTUM ACIDI NITROSI. *Ed.*
Ointment of Nitrous Acid.

Take of
  Hogs lard, one pound;
  Nitrous acid, six drachms.
Mix the acid gradually with the melted axunge, and diligently beat the mixture as it cools.

Dub.

Take of
  Olive oil, one pound;
  Prepared hogs lard, four ounces.
Having melted them together in an earthen-ware vessel, add,
  Nitrous acid, one ounce.
Expose them together to a moderate heat, in a water-bath, for a quarter of an hour; then remove them from the bath, and stir them constantly with a glass rod, until they get stiff.

The oil and axunge in this ointment are oxidized; for during the action of the acid upon them, there is a great deal of nitric oxide gas disengaged. It acquires a yellowish colour, and a firm consistency, and forms an efficacious and cheap substitute, in slight herpetic and other cutaneous affections, for the oint- of nitrate of mercury.

EMPLASTRUM OXIDI PLUMBI SEMIVITREI ; olim EMPLASTRUM COMMUNE. *Ed.*

Plaster of the Semi-vitrified Oxide of Lead, formerly *Common Plaster.*

Take of
  Semi-vitrified oxide of lead, one part ;
  Olive oil, two parts.

Boil them, adding water, and constantly stirring the mixture till the oil, and litharge be formed into a plaster.

EMPLASTRUM LITHARGYRI. *Dub.*

Litharge Plaster.

Take of
  Litharge, in very fine powder, five pounds ;
  Olive oil, nine pounds.
  Boiling water, two pints.

Mix them at a high temparature, 200° to 212° constantly stirring until the oil and litharge unite, so as to form a plaster, occasionally supplying the waste of the water with fresh additions.

EMPLASTRUM PLUMBI. *Lond.*

Lead Plaster.

Take of
  Semi-vitrified oxide of lead, in very fine powder, five pounds ;
  Olive oil, a gallon ;
  Water, two pints.

Boil together with a slow fire, constantly stirring them, until the oil and oxide of lead acquire by their union the thickness of a plaster. But it will be necessary to add a little more boiling water, if that employed at first be almost all consumed before the end of the operation.

OXIDES of lead, boiled with oils, unite with them into a plaster of an excellent consistence, and forming a proper basis for several other plasters.

In the boiling of these compositions, a quantity of water must be added, to prevent the plaster from burning and growing black. Such water as it may be necessary to add during the boiling, must be previously made hot ; for cold liquor would not only prolong the process, but likewise occasion the matter to explode, and be thrown about with violence, to the great danger of the operator : this accident will equally happen upon the addition of hot water; if the plaster be extremely hot. It is therefore better to remove it from the fire a little before each addition of water

These plasters, which have been long known under the name of Diachylon, are common applications in excoriations of the skin, slight flesh wounds, and the like. They keep the part soft and somewhat warm, and defend it from the air, which is all that can be expected in these cases, from any plaster.

EMPLASTRUM RESINOSUM; vulgo EMPLASTRUM ADHÆSIVUM. *Ed.*

Resinous Plaster, commonly called *Adhesive Plaster*.

Take of
- Plaster of semi-vitrified oxide of lead, five parts;
- White resin, one part.

EMPLASTRUM LITHARGYRI CUM RESINA. *Dub.*

Litharge Plaster with Resin.

Take of
- Litharge plaster, three pounds and a half;
- Yellow resin, half a pound.

To the litharge plaster, melted with a moderate heat, add the resin, reduced to a very fine powder, that it may melt quickly, and make a plaster.

EMPLASTRUM RESINÆ. *Lond.*

Plaster of Resin.

Take of
- Yellow resin, half a pound;
- Lead plaster, three pounds.

Add the resin, in powder, to the lead plaster, melted with a slow fire, and mix.

THESE plasters are used as adhesives, for keeping on other dressings; for retaining the edges of recent wounds together, when we are endeavouring to cure them by the first intention, and especially for giving mechanical support to new flesh; and contracting the size of ulcers, in the manner recommended by Mr. Baynton, for the cure of ulcers of the legs, a mode of treatment so efficacious, that it has entirely changed the character of these sores.

EMPLASTRUM ASSÆ FŒTIDÆ. *Ed.*

Plaster of Assafœtida.

Take of
- Plaster of semi-vitrified oxide of lead;
- Assafœtida, each two parts;
- Galbanum,
- Yellow wax, each one part.

THIS plaster is applied to the umbilical region, or over the whole abdomen, in hysteric cases; and sometimes with good effect.

EMPLASTRUM GUMMOSUM. *Ed.*

Gum Plaster.

Take of

Plaster of semi-vitrified oxide of lead, eight parts;
Gum ammoniacum,
Galbanum,
Yellow wax, each one part.

EMPLASTRUM AMMONIACI. *Lond.*

Plaster of Ammoniac.

Take of

Strained gum ammoniac, five ounces;
Acetic acid, half a pint.

Dissolve the ammoniac in the vinegar, then evaporate the solution in an iron pot, by the heat of a water-bath, stirring it constantly till it acquire a proper thickness.

EMPLASTRUM GALBANI. *Dub.*

Plaster of Galbanum.

Take of

Plaster of litharge, two pounds;
Galbanum, half a pound;
Yellow wax, sliced, four ounces.

Add the plaster and wax to the galbanum, melted, and then melt the whole together, with a moderate heat.

EMPLASTRUM GALBANI COMPOSITUM. *Lond.*

Compound Plaster of Galbanum.

Take of

Strained galbanum, eight ounces;
Plaster of lead, three pounds;
Turpentine, ten drachms;
Frankincense, in powder, three ounces.

The galbanum and turpentine being melted together, mix with them the frankincense, and afterwards the litharge plaster, melted also with very slow fire, and make a plaster.

All these plasters are used as digestives and suppuratives; particularly in abscesses, after a part of the matter has been maturated and discharged, for suppurating or discussing the induration which remains.

EMPLASTRUM OPII. *Lond.*

Plaster of Opium.

Take of

Hard opium, in powder, half an ounce;
Frankincense, in powder, three ounces;
Lead plaster, a pound.

Add the opium and frankincense to the melted plaster, and mix.

OPIUM plaster is applied in rheumatisms and other local pains, and is supposed to act by absorption.

CERATUM SAPONIS. *Lond.*
Soap Cerate.

Take of
Hard soap, eight ounces;
Yellow wax, ten ounces;
Semi-vitrified oxide of lead, powdered, one pound;
Olive oil, one pint;
Vinegar, one gallon.

Boil the vinegar with the oxide of lead, over a slow fire, constantly stirring, until they become homogeneous; then add the soap, and repeat the boiling in the same manner, until the moisture be entirely evaporated; and lastly, mix with them the wax previously dissolved in the oil.

THIS acts in reality as a saturnine application, the soap having only the effect of giving a very convenient degree of adhesiveness.

EMPLASTRUM SAPONIS. *Lond. Dub.*
Soap Plaster.

Take of
Soap, sliced, half a pound;
Litharge plaster, three pounds.

Mix the soap with the melted plaster, and boil them to the thickness of a plaster.

EMPLASTRUM SAPONACEUM. *Ed.*
Saponaceous Plaster.

Take of
Plaster of semi-vitrified oxide of lead, four parts;
Gum plaster, two parts;
Soap, sliced, one part.

To the plasters, melted together, add the soap; then boil for a little, so as to form a plaster.

THESE are supposed to be mild discutients,

UNGUENTUM OXIDI PLUMBI ALBI; vulgo UNGUENTUM ALBUM. *Ed.*
Ointment of White Oxide of Lead, formerly *White Ointment.*

Take of
Simple ointment, five parts;
White oxide of lead, one part.

UNGUENTUM CERUSSÆ sive SUB-ACETATIS PLUMBI. *Dub.*
Ointment of Ceruse, or of Sub-acetate of Lead.

Take of
Ointment of white wax, one pound;

Ceruse, in very fine powder, two ounces.
Make into an ointment.

THIS is a cooling desiccative ointment of great use when applied to excoriated surfaces.

UNGUENTUM ACETITIS PLUMBI; vulgo UNGUENTUM SATURNINUM. *Ed.*
Ointment of Acetite of Lead, formerly *Saturnine Ointment.*

Take of
Simple ointment, twenty parts;
Acetite of lead, one part.

UNGUENTUM ACETATIS PLUMBI. *Dub.*
Ointment of Acetate of Lead.

Take of
Ointment of white wax, one pound and a half;
Acetate of lead, an ounce.
Make into an ointment.

CERATUM PLUMBI SUPER-ACETATIS. *Lond.*
Cerate of Super-acetate of Lead.

Take of
Super-acetate of lead, in powder, two drachms;
White wax, two ounces;
Olive oil, half a pint.
Melt the wax in seven fluidounces of the oil, and gradually add to these the super-acetate of lead, separately triturated with the rest of the oil, and stir the mixture with a wooden spatula till it be cold.

THESE are also excellent cooling ointments, of the greatest use in many cases.

CERATUM PLUMBI COMPOSITUM. *Lond.*
Compound Cerate of Lead.

Take of
Solution of acetate of lead, two ounces and a half;
Yellow wax, four ounces;
Olive oil, nine fluidounces;
Camphor, half a drachm.
Mix the melted wax with eight fluidounces, then remove from the fire; and as soon as the mixture begins to thicken, pour in, by degrees, the solution of acetate of lead, and stir constantly, with a wooden spatula, until it be cold; then mix in the camphor, previously melted in the rest of the oil.

THIS composition was much recommended by M. Goulard. It differs from the other saturnine ointments only in consistence.

UNGUENTUM HYDRARGYRI; vulgo UNGUENTUM COERULEUM. *Ed.*

Ointment of Quicksilver, commonly called *Blue Ointment.*

Take of
  Quicksilver,
  Mutton suet, each one part;
  Hogs lard, three parts.

Rub the mercury carefully in a mortar with a little of the hogs lard, until the globules entirely disappear; then add the rest of the fats.

This ointment may also be made with double or treble the quantity of quicksilver.

Dub.

Take of
  Distilled quicksilver,
  Prepared hogs lard, equal weights.

Triturate them together in a marble or iron mortar, until the globules of quicksilver disappear.

UNGUENTUM HYDRARGYRI MITIUS. *Dub.*

Milder Ointment of Quicksilver

Is made with twice the quantity of lard.

UNGUENTUM HYDRARGYRI FORTIUS. *Lond.*

Stronger Mercurial Ointment.

Take of
  Purified quicksilver, two pounds;
  Prepared hogs lard, twenty-three ounces;
  Prepared mutton suet, one ounce.

First triturate the quicksilver with the suet and a little of the hog's lard, until the globules be extinguished; then add the rest of the lard, and form it into an ointment.

UNGUENTUM HYDRARGYRI MITIUS. *Lond.*

Milder Mercurial Ointment.

Take of
  The stronger ointment of quicksilver, one pound;
  Hogs lard, prepared, two pounds.

Mix them.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. *Ed.*

Ointment of Grey Oxide of Quicksilver.

Take of
Grey oxide of quicksilver, one part;
Hog's lard, three parts.

THESE ointments are principally employed, not with a view to their topical action, but with the intention of introducing mercury in an active state into the circulating system; which may be effected by gentle friction on the sound skin of any part, particularly on the inside of the thighs or legs. For this purpose, these simple ointments are much better suited than the more compounded ones, with turpentine and the like, formerly employed; for, by any acrid substance, topical inflammation is apt to be excited, preventing further friction, and giving much uneasiness. To avoid this, it is necessary, even with the mildest and weakest ointment, to change occasionally the place at which the friction is performed.

It is requisite that the ointments in which the mercury is extinguished by trituration should be prepared with very great care; for upon the degree of triture which has been employed, the activity of the mercury very much depends. The addition of the mutton suet, now adopted by both colleges, is an advantage to the ointment, as it prevents it from running into the state of oil, which the hog's lard alone, in warm weather, or in a warm chamber, is sometimes apt to do, and which is followed by a separation of parts. We are even inclined to think, that the proportion of suet, directed by the London college, is too small for this purpose, and, indeed, seems to be principally intended for the more effectual triture of the mercury; but it is much more to be regretted, that in a medicine of such activity, the colleges should not have directed the same proportion of mercury to the fatty matter.

If the efficacy of the ointment prepared with the grey oxide were sufficiently established, the facility and certainty of its preparation would be attended with great advantages.

EMPLASTRUM HYDRARGYRI. *Ed.*

Plaster of Quicksilver.

Take of
Olive oil,
White resin, each one part;
Quicksilver, three parts;
Plaster of semi-vitrified oxide of lead, six parts.

Melt the oil and resin together, and when this mixture is cold, let the quicksilver be rubbed with it till the globules disappear; then add, by degrees, the litharge plaster, melted, and let the whole be accurately mixed.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. *Lond. Dub.*

Plaster of Gum Ammoniac with Quicksilver.

Take of
- Gum Ammoniac, strained, one pound;
- Purified quicksilver, three ounces.
- (Sulphurated oil, a fluidrachm, *Lond.*)
- (Turpentine, two drachms, *Dub.*)

Triturate the quicksilver with the sulphuretted oil, (turpentine, *Dub.*) until its globules disapper; then gradually add the gum ammoniac, melted, and mix them.

EMPLASTRUM HYDRARGYRI. *Lond.*

Plaster of Quicksilver.

Take of
- Purified quicksilver, three ounces;
- Sulphuretted oil, one fluidrachm;
- Litharge plaster, one pound.

Triturate the quicksilver with the sulphuretted oil until the globules disappear; then gradually add the lead plaster melted, and mix the whole together.

These mercurial plasters are considered as powerful resolvants and discutients, acting with much greater certainty for these intentions than any composition of vegetable substances alone; the mercury exerting itself in a considerable degree, and being sometimes introduced into the habit in such quantity as to affect the mouth. Syphilitic pains in the joints and limbs, nodes, tophi, and beginning indurations, are said to yield to them sometimes.

UNGUENTUM HYDRARGYRI PRECIPITATI ALBI. *Lond.*

Ointment of the White Precipitated Quicksilver.

Take of
- The white precipitated quicksilver, one drachm;
- Prepared lard, one ounce and a half.

Add the precipitated quicksilver to the lard, melted with a slow fire, and mix.

UNGUENTUM SUB-MURIATIS HYDRARGYRI AMMONIATI. *Dub.*

Ointment of Ammoniated Sub-muriate of Quicksilver.

Take of
- Ointment of white wax, one pound;
- Ammoniated sub-muriate of quicksilver, an ounce and a half.

Make into an ointment.

This is a very elegant mercurial ointment, and frequently made use of in the cure of obstinate cutaneous affections.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. *Ed.*

Ointment of Red Oxide of Quicksilver.

Take of
Red oxide of quicksilver by nitrous acid, one part;
Hogs lard, eight parts.

UNGUENTUM SUB-NITRATIS HYDRARGYRI *Dub*

Ointment of Sub-nitrate of Quicksilver.

Take of
Ointment of white-wax, half a pound;
Sub-nitrate of quicksilver, half an ounce.
Make into an ointment.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI. *Lond.*

Ointment of Nitric-oxide of Quicksilver.

Take of
Nitric-oxide of quicksilver, an ounce;
White wax, two ounces;
Prepared lard, six ounces.
Add the nitric-oxide, in very fine powder, to the wax and lard, previously melted together, and mix.

THE oxide should be reduced to very fine powder before it be added to the axunge. This is an excellent stimulating ointment, often of very great service in indolent ill-conditioned sores, when we wish to excite them to greater action. As an eye ointment, its effects are most remarkable, in the cure of all inflammations of the tunica conjunctiva, and more particularly when there is a thickening and swelling of the inner membrane of the palpebræ. In such cases, it seems to act with much greater certainty, if applied immediately after the eyelids have been scarified. In inflammation, accompanied with specks, it has a most powerful effect in removing both. It is also useful in all those ophthalmias which so frequently appear after small-pox, measles, and eruptive diseases of the hairy scalp. It is used in the same quantity, and in the same manner, as the unguentum nitratis hydrargyri; and if it prove too stimulating, it may be diluted with axunge.

UNGUENTUM NITRATIS HYDRARGYRI; vulgo UNGUENTUM CITRINUM. *Ed.*

Ointment of Nitrate of Quicksilver, commonly called *Yellow Ointment.*

Take of
Quicksilver, one part;
Nitrous acid, two parts;

Olive oil, nine parts;
Hogs lard, three parts.

Dissolve the quicksilver in the acid, in a glass mortar; then beat up the solution with the lard and oil when getting stiff, after having been melted together, until an ointment be formed.

UNGUENTUM SUPER-NITRATIS HYDRARGYRI. *Dub.*

Ointment of Super-nitrate of Quicksilver.

Take of
Distilled quicksilver, one ounce;
Nitrous acid, by weight, two ounces;
Olive oil, one pint;
Prepared hogs lard, four ounces.

Dissove the quicksilver in the acid; mix the solution with the oil and lard, melted together, and make into an ointment, in the same manner as the ointment of nitrous acid.

UNGUENTUM HYDRARGYRI NITRATIS. *Lond.*

Ointment of Nitrate of Quicksilver.

Take of
Purified quicksilver, one ounce;
Nitric acid, two fluidounces;
Prepared hogs lard, six ounces;
Olive oil, four fluidounces.

First dissolve the quicksilver in the acid, and then mix the solution, while hot, with the lard and oil previously melted

UNGUENTUM NITRATIS HYDRARGYRI MITIUS.

Ed.

Milder Ointment of Nitrate of Quicksilver.

This is prepared in the same way (as the ointment of nitrate of quicksilver), with three times the quantity of oil and hogs lard.

This ointment, when prepared with lard alone, soon becomes so very hard, that it is necessary to mix it with fresh axunge before it can be used. The substitution of the oil for part of the axunge obviates, in a great measure, this inconvenience. The hardening is entirely owing to the excess of the acid in the solution of mercury. But the property which nitrate of mercury, prepared by ebullition, has, of being decomposed by water, furnished me with an easy way of getting rid of all excess of acid, and of procuring the sub-nitrate of mercury in the state of the most minute division possible. An ointment, prepared with this sub-nitrate, had a most beautiful golden colour; after six months was perfectly soft; and succeeded in curing a very bad case of herpes

When the citrine ointment is too hard, it should be softened by triturating it with lard or oil; for, if melted with them, it very soon hardens again.

Medical use.—This ointment has the very best effects in herpes, tinea capitis, and similar obstinate cutaneous affections, and is almost specific in psorophthalmia, in those slight excoriations of the tarsi, attended with extreme itching, and in all the inflammations of the eyes, attended by eruptive disorders of the hairy scalp or face. It is most conveniently and effectually used, by rubbing a piece of the size of half a garden pea, with the point of a hair pencil, over the tarsi, among the roots of the ciliæ, and allowing a small quantity to get on the inner membrane of the palpebræ. In obstinate cases, a weak solution of muriate of mercury, used as a collyrium along with this ointment, proves a most powerful remedy.

UNGUENTUM SUB-ACETITIS CUPRI. *Ed.*
Ointment of Sub-acetite of Copper.

Take of
Resinous ointment, fifteen parts;
Sub-acetite of copper, one part.

UNGUENTUM AERUGINIS. *Dub.*
Ointment of Verdegris.

Take of
Ointment of white wax, a pound;
Prepared verdegris, half an ounce.
Make into an ointment.

THIS ointment is used for cleansing sores, and keeping down fungous flesh. Where ulcers continue to run from a weakness in the vessels of the parts, the tonic powers of copper promise considerable advantage.

It is also frequently used with advantage in cases of ophthalmia, depending on scrofula, where the palpebræ are principally affected; but when it is to be thus applied, it is, in general, requisite that it should be somewhat weakened by the addition of a proportion of simple ointment or hogs lard.

UNGUENTUM OXIDI ZINCI IMPURI; olim UNGUENTUM TUTIÆ. *Ed.*
Ointment of Impure Oxide of Zinc, formerly *Ointment of Tutty.*

Take of
Simple liniment, five parts;
Prepared impure oxide of zinc, one part.

Dub.

Take of
Ointment of white wax, ten ounces;
Prepared tutty, two ounces.
Make into an ointment.

UNGUENTUM OXIDI ZINCI. *Ed.*

Ointment of Oxide of Zinc.

Take of
Simple liniment, six parts;
Oxide of zinc, one part.

Dub.

Take of
Ointment of white wax, one pound;
Oxide of zinc, an ounce and a half.
Make into an ointment.

UNGUENTUM ZINCI. *Lond.*

Ointment of Zinc.

Take of
Oxide of zinc, an ounce;
Prepared lard, six ounces.
Mix.

THESE ointments are chiefly used in affections of the eye, particularly in those cases where redness arises rather from relaxation than from active inflammation.

CERATUM CARBONATIS ZINCI IMPURI; olim CERATUM LAPIDIS CALAMINARIS. *Ed.*

Cerate of Impure Carbonate of Zinc, formerly *Cerate of Calamine.*

Take of
Simple cerate, five parts;
Prepared impure carbonate of zinc, one part.

CERATUM CALAMINÆ. *Lond.*

Cerate of Calamine.

Take of
Calamine, prepared,
Yellow wax, of each half a pound;
Olive oil, one pint.
Mix the oil with the melted wax, and remove from the fire, and, as soon as the mixture begins to thicken, mix with it the calamine, and stir the cerate constantly until it be cold.

UNGUENTUM CALAMINARIS. *Dub.*

Calamine Ointment.

Take of
  Ointment of yellow wax, five pounds ;
  Prepared calamine, one pound.
Make into an ointment.

THESE compositions resemble the cerate which Turner strongly recommends in cutaneous ulcerations and excoriations, and which has been usually distinguished by his name. They appear, from experience, to be excellent epulotics ; and, as such, are frequently made use of in practice.

EMPLASTRUM OXIDI FERRI RUBRI ; olim EMPLASTRUM ROBORANS. *Ed.*

Plaster of Red Oxide of Iron, commonly called *Strengthening Plaster*.

Take of
  Plaster of semi-vitrified oxide of lead, twenty-four parts
  White resin, six parts ;
  Yellow wax,
  Olive oil, each three parts ;
  Red oxide of iron, eight parts.
Grind the red oxide of iron with the oil, and then add it to the other ingredients, previously melted.

EMPLASTRUM THURIS. *Dub.*

Plaster of Frankincense.

Take of
  Plaster of litharge, two pounds ;
  Frankincense, half a pound ;
Melt them together, and add, of
  Red oxide of iron, in very fine powder, three ounces.
Make a plaster.

THIS plaster is used in weaknesses of the large muscles, as of the loins ; and its effects seem to proceed from the mechanical support given to the part, which may also be done by any other plaster that adheres with equal firmness.

TABLES,

Shewing the Proportion of ANTIMONY, OPIUM, *and* QUICKSILVER, *contained in some Compound Medicines.*

TARTRITE OF ANTIMONY.

Wine of Tartrite of Antimony contains two grains of tartrite of antimony or tartar-emetic in the ounce. *Ed.*

Solution of Tartarized Antimony contains two grains of tartarized antimony in a fluidounce, *Lond.*

OPIUM.

Opiate Confection contains one grain of opium in about thirty-six grains. *Lond.*

Opiate or Thebaic Electuary contains in each drachm about a grain and a half of opium. *Ed.*

Electuary of Catechu, or *Japonic Confection,* contains in each ounce about two grains and a half of opium; for one grain of opium is contained in one hundred and ninety-three grains. *Ed.*

Compound Electuary of Catechu contains in each ounce about two grains and a half of purified opium. *Dub.*

Compound Powder of Kino contains a grain of opium in a scruple. *Lond.*

Compound Powder of Chalk with Opium contains one grain of opium in two scruples. *Lond.*

Compound Powder of Ipecacuan contains one grain of opium in ten grains. *Lond. Dub.*

Powder of Ipecacuan and Opium contains six grains of opium in each drachm, or one grain in ten. *Ed.*

Powder of burnt Horn with Opium contains one grain of opium in ten. *Lond.*

Opiate or Thebaic Pills contain six grains of opium in each drachm, or five grains contain half a grain of opium. *Ed.*

Pills of Storax, in five grains of the mass, contain one grain of purified opium *Dub.*

Pills of Soap with Opium contain one grain of opium in five. *Lond.*

Tincture of Opium or *Liquid Laudanum* is made with two scruples of opium in each ounce of the liquid, or with five grains in each drachm; but a drachm of the tincture appears, by evaporation, to contain about three grains and a half of opium. *Ed.*

Tincture of Opium contains, in a drachm measure, about four grains and a half of purified opium. *Dub.*

Camphorated Tincture of Opium contains, in four drachms and a half, by measure, one grain of purified opium. *Dub.*

Ammoniated Tincture of Opium, or Paregoric Elixir, is made with about eight grains in each ounce of the liquid, or with about one grain in the drachm. *Ed.*

Syrup of Opium contains in an ounce measure about a grain of the watery extract of opium; for the liquor, by the addition of the sugar, is more than doubled in bulk. *Dub.*

Tincture of Soap and Opium, formerly called *Opiate Liniment Anodyne Balsam,* is made with one scruple of opium in each ounce of the liquid. *Ed.*

Troches of Liquorice with Opium contain about one grain of opium in each drachm. *Ed.*

QUICKSILVER.

Solution of Oxymuriate of Mercury contains half a grain of oxymuriate of mercury in a fluidounce. *Lond.*

Quicksilver Pills contain five grains of quicksilver in each drachm. Each pill contains one grain of quicksilver. *Ed.*

Quicksilver Pills contain one grain of quicksilver in three grains. *Lond.*

Quicksilver Pills contain in six grains two of quicksilver. *Dub.*

Pills of Submuriate of Quicksilver contain a grain of submuriate of quicksilver in about five grains. *Lond.*

Quicksilver Ointment contains twelve grains of quicksilver in each drachm; made with double quicksilver, each drachm contains twenty-four grains. *Ed.*

Stronger Quicksilver Ointment contains one drachm of quicksilver in two drachms. *Lond. Dub.*

Weaker Quicksilver Ointment contains one drachm of quicksilver in six drachms. *Lond.*

Quicksilver Plaster contains about sixteen grains of quicksilver in each drachm. *Ed.*

Quicksilver with Magnesia, in three grains, contains two of quicksilver. *Dub.*

Stronger Ointment of Nitrate of Quicksilver contains in each drachm four grains of quicksilver and eight of nitrous acid. *Ed.*

Milder Ointment of Nitrate of Quicksilver contains in each scruple half a grain of quicksilver and one grain of nitrous acid *Ed.*

ARSENIC.

Solution of Arsenic contains four grains of oxide of arsenic in a fluidounce. *Lond.*

IRON.

Tincture of Acetate of Iron with Alcohol, in a drachm measure, contains about a grain of dry acetate of iron. *Dub.*

◆

OR,

One grain of *Tartrite of Antimony* is contained in

Wine of tartrite of antimony. *Ed.*	grs. 240
Wine of antimoniated tartar. *Dub.*	120
Solution of tartarized antimony. *Lond.*	240
Pills of sub-muriate of quicksilver.	4

One grain of *Opium* is contained in

Confection of opium. *Lond.*	grs. 36
Opiate electuary. *Ed.*	43
Electuary of Catechu. *Ed. Dub.*	193
Troches of liquorice with opium. *Ed.*	75
Pills of soap with opium. *Lond.*	5
Pills of storax. *Dub.*	5
Opiate pills. *Ed.*	10
Powder of burnt horn with opium. *Lond.*	10
Compound powder of chalk with opium. *Lond.*	43
Compound powder of ipecacuan. *Lond. Dub.*	10
Powder of ipecacuan and opium. *Ed.*	10
Tincture of opium. *Ed. Dub.*	12
Tincture of opium. *Lond.*	18
Camphorated tincture of opium *Dub.*	244
Compound tincture of camphor. *Lond.*	244
Ammoniated tincture of opium. *Ed.*	68
Tincture of soap and opium. *Ed.*	31.5
Syrup of opium. *Dub.*	480
Wine of opium. *Lond.*	16

One grain of *Quicksilver* is contained in

Quicksilver pills. *Lond. Dub.*	grs 3
Ditto. *Ed.*	4

Stronger quicksilver ointment. *Lond. Dub.*	grs. 2
Weaker quicksilver ointment. *Lond. Dub.*	6
Quicksilver ointment. *Ed.*	5
Quicksilver plaster. *Ed.*	5.5
Plaster of quicksilver. *Lond.*	5.
Ammoniac plaster with quicksilver. *Lond.*	5.
Quicksilver with magnesia. *Dub.*	1.5
Quicksilver with chalk. *Dub.*	1.5

One grain of *Calomel* is contained in

Pills of submuriate of quicksilver	grs. 4

One grain of the *Grey Oxide of Quicksilver* is contained in

Ointment of the grey oxide of quicksilver. *Ed.*	grs. 4

One grain of the *Red Oxide of Quicksilver* is contained in

Ointment of red oxide of quicksilver. *Ed.*	grs. 9
Ointment of nitric-oxide of quicksilver. *Lond.*	9

One grain of *Submuriate of Quicksilver and Ammonia* is contained in

Ointment of white precipitated quicksilver. *Lond.*	grs. 13

One grain of *Nitrate of Mercury* is contained in

Stronger ointment of nitrate of quicksilver. *Ed.*	grs. 5
Ointment of nitrated quicksilver. *Lond. Dub.*	5
Milder Ointment of nitrate of quicksilver. *Ed.*	13

One grain of *Oxymuriate of Mercury* is contained in

Solution of oxymuriate of quicksilver. *Lond.*	grs. 960

One grain of *Oxide of Arsenic* is contained in

Solution of arsenic. *Lond.*	grs. 120

In many instances these proportions are only to be considered as approximations to the truth, as they are calculated from the quantities of the ingredients taken to form the preparation, not from the quantities which exist in it after it is formed. The *nitrate of mercury*, for example, in the different ointments into which it enters, is estimated as equal to the whole quantity of mercury and nitrous acid employed to form it, although, from the very nature of the preparation, it cannot be so much. In the solutions of opium, the opium is estimated as equal to the whole quantity employed, although not above two-thirds of it be dissolved. And, lastly, no allowance is made for the loss by evaporation.

POSOLOGICAL and PROSODIAL TABLE.

ACETIS potassæ, ℈ i to ʒ i.
Acētitis ammonĭæ aqua, ʒ ij to ʒ vi.
Acĭdum acetōsum impurum, ʒ i to ℥ ſs; ℥ i to ℥ ij, *in glyster*
aromătĭcum *analeptic.*
camphorātum *analeptic.*
destillātum, do.
forte, ℈ i to ʒ i.
Acĭdi acetōsi syrupus, ʒ i to ʒ ij.
Acĭdum benzoĭcum, gr x to ʒ ſs.
Acidi carbōnĭci aqua, ℔ ij *daily.*
muriātĭcum, gt x to gt xl.
nitrōsum, gt v to gt xx.
dilūtum, gt x to gt xl.
succĭnĭcum, gr v to ℈ i.
sulphŭrĭcum dilūtum, gt x to gt xl.
aromătĭcum, gt x to gt xl.
Aconīti napelli herba, gr i to gr v.
succus spissatus, gr ½ to gr iij.
Acŏri călămi radix, ℈ i to ʒ i.
Aescŭli hippocastăni cortex, ʒ ſs to ʒ i.
Aether sulphurĭcus, gt xx to ʒ i.
cum alcohōle, ʒ ſs to ʒ ij.
cum alcohōle, aromatĭcus, ʒ ſs to ʒ ij.
Aetheris nitrĭci spiritus, ʒ ſs to ʒ ij.
Alcŏhol, ʒ ſs to ʒ i.
ammoniātum, ʒ ſs to ʒ i.
aromatĭcum, ʒ ſs to ʒ i.
fœtĭdum, ʒ ſs to ʒ i.
succinātum, gt x to gt xl.

Allii porri radīcis succus, ʒ i to ℥ ſs.
Allii satīvi radix, ʒ i to ʒ ij.
succus, ʒ i to ℥ ſs.
Alŏes perfoliātæ (socotorinæ) decoctum, ℥ ſs to ℥ ij.
extractum, gr v to xv.
pilŭlæ, gr xv to ʒ ſs.
pilulæ composĭtæ, gr x to xxv.
pilulæ cum assafœtĭda, gr x to ℈ i.
cum cŏlŏcynthĭde, gr v to gr x.
cum myrrha, gr x to ℈ i.
pulvis compositus, gt x to ℈ i.
pulvis cum canĕlla, gr x to ℈ i.
pulvis cum ferro, gr v to ℈ i.
pulvis cum guāiăco, gr x to ℈ i.
Aloes vulgāris (hepatĭcæ), succus spissātus, gr v to gr xx.
tinctūra, ʒ ſs to ʒ ij.
tinctura cum myrrha, ʒ ſs to ʒ ij.
tinctura æthĕrea, ʒ ſs to ʒ ij.
vīnum, ℥ ſs to ℥ i.
Althææ officinālis decoctum, *ad libitum.*
syrūpus, ʒ i to ʒ iij.
Alūmĭnæ sulphas gr x to ℈ i.
sulphātis pulvis compositus, gr x to ʒ j.
Ammōniæ aqua, gt x to xv.
acetitis aqua ʒ ij to ℥ ſs.
carbōnas, gr v to gr xv.
carbōnātis aqua, gt xx to ʒ i.
hydro-sulphuretum, gt v to xij.
murias gr x to ʒ ſs.
Ammōniăcum gummi-resīna, gr x to ʒ ſs.
Ammōniăci mistura, ʒ ij to ℥ i.
Amōmi zingĭbĕris rādix, gr v to ℈ i.
syrupus, ʒ i to ʒ ij.
tinctura, ʒ i to ʒ ij.
repentis semina, gr v to ℈ i.
tinctura, ʒ i to ʒ ij.
tinctura composita, ʒ i to ʒ ij.
zedoārĭæ radix, ℈ i to ʒ i.
Amygdăli commūnis oleum fixum, ℥ ſs to ℥ i.
emulsio, ℔ ij *daily.*
Amygdalæ confectio, ʒ i to ℥ ſs.
Amy̆li mucilāgo, ʒ i to ℥ i ℥ iv ℥ vj *in glyster.*
trochĭsci, ʒ i to ʒ ij.
Amy̆rĭdis elĕmifĕræ resinæ, gr x to ʒ ſs.
gileadensis resina liquida, ℈ i to ʒ i.
Anēthi grăvĕŏlentis semĭna, ℈ i to ʒ i.
aqua destillata, ℥ i to ℥ iij.

Anethi fœnĭcŭli semina, ℈ i to ʒ i.
aqua destillāta, ℥ i to ℥ iij.
oleum volatĭle, gt ij to gt v.
Angĕlĭcæ archangĕlĭcæ radix, herba, semen, ʒ ſs to ʒ iij.
Angustūræ cortex, gr x ts ʒ i.
infusum ℥ ſs to ℥ iv.
Anthemĭdis nobĭlis flores, ℈ i to ʒ i.
decoctum, *in glyster.*
extractum, gr x to ʒ i.
infusum, ℥ ſs to ℥ iv.
oleum, gtt v to gtt x.
pyrĕthri radix, gr iij to ℈ ſs.
Antimonii sulphurētum præparātum, gr v to ℈ ij.
fuscum (*kermes mineralis*), gr i to iſs.
præcipitātum, gr i to v.
oxĭdum, gr i to x.
oxĭdum cum sulphŭre per nitrātem potassæ gr i to iv.
cum sulphŭre vitrificātum, gr $\frac{1}{4}$ to iſs.
vitrificātum cum cēra, gr iij to ℈ i.
cum phosphāte calcis, gr iij to viij.
album (*antimonium calcinatum*), gr x to ʒ ſs.
et potassæ tartris,
as a diaphoretic, gr $\frac{1}{4}$ to $\frac{1}{2}$.
as an emetic, gr $\frac{1}{2}$ to gr iij.
tartarizati aqua, ʒ i to ʒ ij.
tartrītis vinum, ʒ ij to vi.
vinum, ʒ iij to ℥ ſs.
pilulæ compositæ, gr iij to v.
Apĭi petrŏsĕlīni semĭna, ℈ i to ij.
Arbŭtĭ uvæ ursi folia, gr x to ℈ ij.
Arctĭi lappæ radix, *a decoction of* ℥ ij *in* ℔ ij *of water, daily.*
Argenti nitras, gr $\frac{1}{8}$ to $\frac{1}{2}$.
Ari maculāti radix, gr vi to ℈ i.
conserva, ʒ ſs to ʒ iſs.
Aristolochiæ serpentāriæ radix, gr x to ʒ ſs.
tinctura, ʒ i to ʒ ij.
Arnĭcæ montānæ herba, gr v to x.
Arsenĭci oxĭdum album, gr $\frac{1}{8}$ to $\frac{1}{4}$.
aqua, gt v. to x.
Artĕmisiæ abrŏtăni folia, ℈ i to ʒ i.
absinthĭi herba, ℈ i to ℈ ij.
maritĭmæ cacūmina, ℈ i to ʒ i.
conserva, ʒ ij to ℥ ſs.
santonĭcæ cacūmina, ʒ ſs to ʒ i.
Asări Europææ folia, gr v to x.
pulvis compositus, gr v to ʒ i
Astragali tragăcanthi gummi, gr x to ʒ i.

Astragăli tragăcanthæ pulvis compositus, ʒ ſs to ʒ i.
Atrŏpæ belladonnæ folia, gr ſs to gr v.
succus spissatus, gr i to gr iij.
Barytæ muriātis solūtio, gr v to x.
Bitūmen petrolĕum sulphurātum, gr v to ʒ ſs.
Bitūminis petrolĕi olĕum gr x to ʒ ſs.
Bōlus gallĭcus, ℈ i to ʒ i.
Bubōnis galbăni gummi resĭna, gr x to ℈ i.
pilŭlæ compositæ, gr x to ʒ ſs.
tinctūra, ʒ i to iij.
Calcis aqua, ℥ iv to ℔ i *daily*.
muriātis solūtio, gr xl to ʒ i.
Calcis carbōnas preparātus, ℈ i to ʒ ij.
carbōnātis mistūra, ℥ i to ij.
pulvis composĭtus, ℈ i to ij.
pulvis compositus cum opio, gr xv. to ℈ i.
trochisci, ʒ i to ij.
Cancri astăci lapilli præparātæ, ʒ i to i.
pagūri chelæ præparātæ, ʒ ſs to i.
chelarum pulvis compositus, ℈ i to j.
Canellæ albæ cortex, gr v to ℈ ij.
Capsĭci annui fructus, gr v to x.
tinctura, ʒ ſs to ʒ i.
Cardamīnes prătensis flores, ℈ i to ʒ i.
Cari carŭi semĭna, gr x to ʒ i.
aqua, ℥ i to ℥ iij.
oleum volatile, gr i to v.
spiritus, ʒ i to ℥ i.
Caryophylli arŏmatĭci floris germen, gr v to ℈ i.
oleum volatile, gr iij to vi.
infūsum ℥ i to ℥ ii.
Cassiæ fistŭlæ pulpa, ℥ ſs to i.
electuarium, ℥ i to ʒ i.
Cassiæ sennæ folia, ℈ i to ʒ i.
electuārium, ʒ ſs to ℥ ſs.
extractum, gr x to ʒ ſs.
infūsum, ℥ i to iij.
infūsum tartarisatum, ℥ iſs to iij.
pulvis compositus, ℈ i to ʒ i.
tinctura, ℥ ſs to ℥ i.
Castŏrĕum Rossĭcum, gr x to ℈ i.
Castorei tĭnctūra, ʒ ſs to i.
composĭta, ʒ ſs to i.
Centaureæ benĕdictæ herba, gr xv to ʒ i.
Cephaēlĭdis ipecacŭanhæ radix,
as a stomachic, gr ſs to gr ij.
as an emetic, ℈ i to ʒ ſs.

Cephaëlidis ipecacuanhæ vinum,
as a stomachic, gt xx to xl.
as an emetic, ℥ ſs to ʒ
pulvis compositus, gr x to ℈ .
Cēra, ℈ i to ʒ i, *in emulsion.*
Chironīæ centaurĕi summitates, ℈ i to ʒ i.
Cinăræ scŏlymi folia, ℥ ſs to i, *of the expressed juice.*
Cinchōnæ officinālis cortex, ℈ i to ʒ ij.
decoctum, ℥ i to ℥ iv.
extractum, gr x to ℈ i.
extractum cum resīna, gr v to ℈ i.
infūsum, ℥ i to iv.
tinctūra, ʒ i to ʒ ij.
tinctūra ammoniata, ʒ ſs to ij.
tinctūra composita, ʒ i to ij.
Cissampĕli pareiræ radix, gr xv to ℈ ij.
Cisti cretĭci resīna (Ladănum), gr x to ʒ ſs.
Citri aurantii folia, flores, gr x to ʒ i.
fructus cortex exterior, ʒ ſs to ℈ ij.
aqua destillata, ℥ i to iij.
conserva cortĭcis, ʒ i to v.
infūsum compositum, ℥ i to ℥ iv.
syrūpus corticis, ʒ i to ij.
tinctūra corticis, ʒ i to ij.
Citri medĭcæ, succus expressus, ʒ i to ℥ ſs.
succus spissātus, ʒ i to ʒ ij.
syrūpus succi, ʒ i to ij.
fructus cortex exterior, ℥ ſs to ij, *in infusion.*
aqua destillata, ʒ i to ij.
oleum volatile, gt ii to gt v.
Cocci cactus, gr v. to ℈ i.
Cochlearĭæ officinālis herba, ℥ i to iv, *of the juice.*
succus compositus, ℥ i to iv.
Cochleāriæ armoracĭæ radix, ℈ i to ʒ i.
infusum compositus, ℥ ſs to ℥ iv.
spirĭtus compositus, ʒ i to ℥ i.
Colchĭci autumnālis radix, gr ſs to iij.
syrūpus, ʒ i to ℥ i.
oxymel, ʒ i to ℥ ſs.
acetum, ʒ ſs to ʒ i.
Cŏlombæ rādix gr x to ℈ i.
infusum, ℥ i to ℥ iv.
tinctura, ʒ i to ij.
Confectio aromatĭca, gr x to ʒ i.
opiāta, gr x to ʒ ſs.
Conīi maculati folia, gr ij to ℈ i.
succus spisātus, gr i to gr ij.
Convolvŭli scammonīæ gummi resīna, gr v to gr xv.
electuārium, ℈ i to ʒ i.

Convolvŭli scammōnĭæ pulvis composĭtus, gr x to gr xv.
pulvis cum aloe, gr x to gr xv.
pulvis cum calomelăne, gr x to ℈ i.
Convolvuli jalapæ radix, gr x to ʒ ſs.
extractum, ℈ ſs to ℈ i.
pulvis compositus, ʒ ſs to ʒ i.
tinctura, ʒ i to ij.
Copaifĕræ officinālis resīna, gr xv to ʒ ſs.
Corĭandri satīvi semĭna ℈ i to ʒ i.
Cornu ustum, ʒ ſs to ʒ ij.
Cornu usti mistura, ℥ iv to ℔ ſs.
cum opio pulvis, gr xv to ʒ ſs.
Croci satīvi floris stigmăta, gr v to ʒ ſs.
syrūpus, ʒ i to ij.
tinctūra, ʒ ſs to ij.
Crotōnis elutheriæ cortex, gr x to ʒ i.
extractum, gr x to ʒ ſs.
tinctūra, ʒ i to ʒ ij.
infusum, ℥ i to ℥ iv.
Cŭcŭmeris cŏlŏcynthidis fructus medulla, gr i to viij.
extractum, gr v to ʒ ſs.
extractum compositum, gr v to ʒ ſs.
Cumīni cymīni semina, ℈ i to ʒ i.
Cupri sub-acētis, gr $\frac{1}{8}$ to $\frac{1}{2}$.
ammoniarētum, gr $\frac{1}{2}$ to gr v.
ammoniarēti aqua, gt v to gt xxx.
ammoniarēti pilulæ, No. i.
sulphas, gr i to x.
Curcumæ longæ radix, ℈ i to ʒ i.
Daphnes mezerĕi radīcis cortex, gr i to x.
decoctum, ℔ i *daily.*
Datūræ stramonĭi herba, gr. i to v.
Dauci carotæ semĭna, ℈ i to ʒ i.
Delphinĭi staphisāgrĭæ semina, gr iij to x.
Dianthi caryophylli flores, ℈ i to ʒ i.
syrūpus, ʒ i to ij.
Digitālis purpŭreæ folia, gr ſs to iij.
infusum, ℥ ſs to ℥ i.
tinctura, gt x to xl.
Dŏlĭchi prurĭentis pubes leguminis rigida, gr v to x.
Contrayērvæ dorstēnĭæ radix gr x to ʒ ſs.
pulvis compositus, ℈ i to ij.
Electuarium opiātum, ℈ i to ij.
Eryngĭi maritĭmi radix, ʒ i to ij.
Ferri acetāti tinctura, gt x to xxx.
alkalini aqua, ʒ ſs to ʒ i.
arbōnas, ʒſs to ʒi.

Ferri carbōnas præcipitātus ʒ ſs to ʒ i.
limatura, gr iij to gr x.
mistura composita, ℥ i to ℥ ij.
murĭatis tinctūra, gt x to xx.
et ammōniæ tinctūra, gt xx to ʒ i.
et potassæ tartris, gr x to ʒ ſs.
et ammōniæ murĭas, gr iij to xv.
oxĭdum nigrum purificātum, do.
super-carbōnātis aqua, ℔ i, *daily*.
pilulæ cum myrrhæ, gr x to ℈ i.
sulphas, gr i to v.
vinum, ʒ i to ℥ ſs.
Ferŭlæ assa fœtida gummi resĭna, gr x to ʒ ſs.
mistura, ℥ ſs to ʒ i.
pilŭlæ compositæ, gr x to xx.
tinctura, ʒ ſs te ʒ i.
Fici carĭcæ fructus, No vi, *in decoction.*
Fraxĭni orni succus concrētŭs (*Manna*), ℥ ſs to i ſs.
succi concreti syrupus, ℥ i to ℥ ij.
Fumārĭæ officinālis herba, ℥ i to ℥ ij, *of the expressed juice.*
Gentiānæ lutĕæ radix gr x to ℈ ij.
infūsum compositum, ℥ iſs to iv.
extractum gr x to ℈ ij.
tinctūra composita, ʒ to ij.
vinum compositum, ℥ ſs to ℥ i.
Geoffrææ inermis cortex, ℈ i to ij.
decoctum ℥ i
Glycyrrhīzæ glabræ radix, gr x to ʒ i.
extractum, ʒ i to ij.
troschisci, ʒ i to ij.
trochisci cum opio, ʒ i, to ℥ ſs *during the day.*
Gratiŏlæ officinalis herba, gr x to ℈ i.
Guāiăci officinālis resina, gr x to ʒ ſs.
decoctum compositum, ℔ ij *daily.*
mistura, ℥ i to ℥ ij.
tinctūra, ʒ i to ʒ ij.
tinctūra ammōniata, ʒ i to ij.
Hæmatoxȳli Campechiāni extractum, ℈ i to ij.
lignum, ℈ i to ʒ i.
Hellĕbŏri nigri radix, gr x to ℈ i.
extractum, gr v to gr x.
tinctura, ʒ ſs to i.
fœtĭdi folia, gr x to ʒ i.
Hordĕi distĭchi decoctum, ℥ ij to vj.
compositum, ℥ ij to vj.
Hūmuli lupŭli extractum, gr v to ℈ i.
strobŭli, gr x to ℈ i.
Hydrargȳrum purificatum, ℥ ij to iv.

Hydrargȳrum cum crēta, gr x to ʒ ſs.
Hydrargȳri acētis, gr i to vj.
murĭas, gr $\frac{1}{8}$ to $\frac{1}{2}$.
oxymuriatis liquor, ʒ i to ℥ ſs.
oxidum cinereum, gr i to gr v.
oxĭdum rubrum, gr ſs to gr ij.
pilŭlæ, gr v to xv.
sub-murias, gr i to gr v.
præcipitātus, gr i to gr v.
sub-muriatis pilulæ, gr to gr xv.
sub-nitras et ammoniæ, gr v to gr x.
sub-sulphas, gr i to gr v.
sulphurētum nigrum, ℈ i to ʒ i.
rubrum gr x to ʒ ſs.
Hyosciămi nigri herba, semen, gr iij to gr x.
succus spissatus, gr i to v.
tinctura, gtt xx to ʒ i.
Hyperĭci perforāti flores, ℈ i to ʒ i.
Hysōpi officinālis herba, ℈ i to ʒ i.
Inŭlæ hĕlĕnii radix, ℈ i to ʒ i.
Irĭdis florentīnæ radix, ℈ i to ʒ i.
Irĭdis pseudăcŏri radicis succus expressus, gt lx to lxxx.
Isis nobilis (Corallium), gr x to ʒ i.
Juglandis regiæ fructus, *externally in decoction.*
Junĭpĕri commūnis baccæ, ʒ ſs to i.
oleum volatile, gtt ij to x.
spiritus compositus ʒ i to ℥ i.
Juniperi lycĭæ gummi resina (Olĭbănum), ℈ i to ij.
Juniperi sabīnæ foliæ, gr x to ℈ ij.
extractum, gr x to ʒ ſs.
tinctura composita, gtt xxx to ʒ i.
Kino, gr x to ℈ i.
pulvis compositus, gr v to ℈ i.
tinctura, ʒ i to ij.
Lactŭcæ virosæ succus spissātus gr iij to xv.
Lauri cinnamōmi cortex, gr v to ℈ i.
aqua destillata, ℥ i to iij.
oleum volatile, gtt i to ij.
pulvis compositus, gr v to gr x.
spiritus, ʒ i to ℥ i.
tinctura, ʒ i to ʒ ij.
tinctura composita, ʒ ſs to ij.
Laurus cassia, *considerably weaker than the preceding species, in other respects similar.*
Lauri camphŏræ, camphora, gr iij to ℈ i.
acidum acetosum, *odour analeptic.*
emulsio, ℥ ſs to ij.
tinctura composita, ʒ ſs to ℥ ſs.

Lauri nobĭlis folia; baccæ, gr x to ʒ ſs.
Lauri fassăfras lignum; radix, eorumque cortex, ℈ i to ʒ i.
oleum volatile, gt ij to gt x.
Lavandŭlæ spicæ florentes, ℈ i to ʒ i.
oleum volatile, gt i to v.
spirĭtus, *an analeptic perfume.*
spirĭtus composĭtus, ʒ ſs to ℥ ſs.
Leontŏdi taraxăci radix, ʒ ſs to ʒ i, herba, ℥ i to ij, *of the juice.*
extractum, gr x to ʒ i.
Lichen, ℈ i to ʒ i.
Lichenis islandici decoctum, ℥ i to ℥ iv.
Lilii candĭdi radix, *externally as a poultice.*
Līni usitatissimi semina, *in infusion,* ℥ i *to water* ℔ i.
oleum fixum, ℥ ſs to ℥ i; *or, in clysters,* ℥ iij to vj.
infusum, ℥ iſs to ℥ iv.
Lini cathartĭci herba, ʒ ſs to ʒ i, *or an infusion of a handful of the fresh plant.*
Lobēliæ syphilitĭcæ radix, ℥ ſs, *boiled in* ℔ xij *of water to* ℔ viij; *half a pint twice a-day.*
Magnēsĭa, gr x to ℈ i.
Magnesiæ carbōnas, ℈ i to ʒ i.
troschisi, ʒ i to ij.
sulphas, ℥ ſs to ℥ ij.
Malvæ sylvestris folia, flores, ʒ ſs to ʒ i.
Marrŭbĭi vulgāris herba, ʒ ſs to ʒ i.
Mel despumātum, ʒ ij to ℥ i; *in clysters* ℥ iij.
acetatum, ʒ i to ℥ ſs.
boracis, ʒ i to ʒ ij.
rosæ, ʒ i to ℥ ſs.
Melĕleucæ leucădendri oleum volatile, gt i to v.
Melissæ officinālis herba, gr x to ℈ ij.
Melŏes vesĭcatorii pulvis, gr ſs to i.
tinctura, gt x to xxx.
Menthæ virĭdis herba, gr x to ʒ i.
aqua, ℥ i to iij.
oleum volatile, gt ij to gt v.
spiritus, ʒ i to ℥ i.
Menthæ pīperītæ herba, gr x to ℈ ij.
aqua, ℥ i to iij.
oleum volatile, gt i to gt iij
spiritus, ʒ i to ℥ i.
Menthæ pūlĕgĭi herba, gr x to ℈ ij.
aqua, ℥ i to iij.
oleum, gt ij to v.
spiritus, ʒ i to ℥ i.
Menyanthis trĭfoliātæ herba, ʒ ſs to ʒ i.

Mimōsæ catĕchu extractum, gr x to ʒ ſs.
electuārium, ℈ i to ʒ i.
infusum, ℥ i to iij.
tinctura, ʒ i to ij.
Mimosæ nilotĭcæ gummi, ʒ i to ij.
emulsio, ℔ ij *daily*
mucilago, ʒ i to ℥ ſs.
Momordĭcæ elaterĭi succus spissatus, gr ſs to gr vj.
Mori nigræ syrupus, ʒ i to ℥ ſs.
Moschus, gr v to ℈ i.
Moschi tinctura, ʒ i to ℥ ſs.
mistūra, ʒ ſs to ʒ i.
Murĭas ammoniæ, gr x to ʒ ſs.
Murĭas sodæ, ʒ iij to ℥ ſs, *in clysters.*
Myrīstĭcæ moschātæ fructus nucleus, gr v to ℈ i.
involucri oleum expressum, *externally.*
nŭcis involucrum, (Macis), gr x to ℈ i.
oleum volatile, gt ij to gt v.
spiritus, ʒ ij ad ℥ i.
Myroxȳli peruiferi balsamum, gr v to ʒ ſs.
tinctura, ʒ ſs to ʒ i.
Myrrha, gr x to ʒ ſs.
Myrrhæ tinctura, ʒ i to ij.
pulvis compositus, gr xv to ℈ j.
Myrti pimentæ fructus, gr v to ℈ ij.
aqua destillata, ℥ i to iij.
oleum volatile, gt ij to v.
spiritus, ʒ i to ℥ i.
Nicotiānæ tabāci folia, gr ſs to v.
vinum, gt xxx to gt lxxx.
Oleæ Europææ oleum fixum, ℥ ſs to ℥ i.
Oleum animale, gt x to xl.
vini, gt i to iv.
Onisci aselli (Millipĕdæ præparatæ), ʒ i to ij.
Opĭum, gr ſs to gr ij.
Opĭi pilulæ, gr v to ℈ i.
extractum, gr ſs to gr v.
tinctura, gt xx to xl.
ammoniāta, ʒ ſs to ij.
camphorāta, ʒ ſs to ij.
vinum, gtt x to ʒ ſs.
Orīgăni vulgāris herba, gr x to ℈ i.
oleum volatile, gt i to ij.
marjorānæ herba, ℈ i to ʒ i.
Ostrĕæ edulis testæ præpărātæ, ʒ ſs to i.
Ovis ariĕtis sevum præpărātum, *externally.*

Oxalis acetosellæ folia, ℥ ſs to ℥ iſs *of the juice.*
conserva, ʒ ij to ℥ ſs.
Pæneæ sarcŏcōllæ gummi resina (Sarcocolla), gr x to ʒ ſs.
Panăcis quinquefolii radix, ℈ i to ʒ i.
Papāveris rhœæ flores, ʒ i *in decoction.*
syrupus, ʒ i to iij.
Papāveris somniferi syrupus, ℥ ſs to i *to adults;* ʒ i to ij *to children;* one ounce *is supposed to contain one grain of opium.*
extractum, gr i to v.
succus spissatus (Opium), gr ſs to gr ij.
Parietārĭæ officinalis herba, gr x to ʒ i, or ℥ i to iij *of the juice.*
Pastinācæ opŏpŏnăcis gummi resina, gr x to ʒ ſs.
Phasiāni galli ovōrum testæ præparātæ, ʒ ſs to i.
Physetĕris macrocephăli sevum (Spermăcĕti), ʒ ſs to iſs.
Pimpĭnellæ anīsi semĭna, gr xv to ʒ ſs.
olĕum volatĭle, gt v to gt x.
spirĭtus composĭtus, ʒ i to ℥ ſs.
Pini abĭĕtis resina, gr x to ʒ ſs.
Pini balsămeæ resina liquida (Balsamum Canadense), gt x to ʒ ſs.
Pini larĭcis resina liquida, (Terebinthĭna vĕnĕta), gt x to ʒ ſs; *and in clysters,* ℥ ſs to i.
Pini sylvestris resina liquida (Terebinthĭna vulgāris) gt x to ʒ ſs.; *and in clysters,* ℥ ſs to i.
resina empyreumatica (Pix liquida), ℈ i to ʒ i.
Pini oleum volatile (Oleum terebinthinæ) rectificatum, gt x to ʒ ſs.
Pipĕris nigri baccæ, gr x to ℈ i.
cubebæ baccæ, gr v to ℈ i.
longi fructus, gr v to ℈ i.
Pistacĭæ lentĭsci resina (Mastĭche), gr v to ʒ ſs.
terĕbinthi resina liquida (Terebinthina Chia), ℈ i to ʒ i.
Plumbi acetis, gr ſs to ij.
Polygalæ senĕgæ radix, ℈ i to ʒ ſs.
senĕgæ decoctum ℥ ſs to ij.
Poly̆gŏni bistortæ radix, gr x to ʒ i.
Poly̆podii filicis māris radix, ʒ i to ij.
Potassæ aqua, gt x to xxx.
acētis, ℈ i to to ʒ i.
carbonas, gr v to ℈ i.
carbonātis aqua, ʒ ſs to ʒ i.
nitras gr v to ℈ i.
nitrātis trochisci, ʒ i to ij.
sulphas ℈ i to ℥ ſs.
sulphas cum sulphure, gr xv to ʒ ſs.
super-sulphas, ℈ i to ʒ ij.
super-carbōnātis aqua, ℥ vj to ℔ i.
sub-carbonas, gr v to ℈ i.

Potassæ sulphurētum, gr v to xv.
super-tartris, ʒ i to ℥ i.
tartris, ʒ i to ℥ i.
Potentillæ reptantis radix, ʒ ſs to i.
Prūni domestĭcæ fructus, ℥ ij to iij, *stewed*
spinōsæ fructus.
conserva, ʒ ij to ℥ ſs.
Pterŏcarpi dracōnis resīna, gr x to ℈ ij.
Pulvis aromaticus, gr v to gr x.
opiātus, gr v to gr x.
Pūnĭcæ granāti fructus cortex, ℈ i to ʒ i.
floris petala, ʒ ſs to i ſs.
Pyri cydoniæ decoctum, ℥ i to ℥ iv.
Quassiæ simarūbæ cortex, ℈ i to ʒ ſs *or* ʒij *in decoction.*
simarūbæ infusum, ℥ iſs to ℥ iv.
excelsæ lignum, gr v to ℈ i; *or* ℥ i to ij *of an infusion of* ʒ ij *in* ℔ i *water.*
infusum, ℥ iſs to ℥ iv.
Quercus rŏbŏris cortex, gr x to ʒ ſs; *or* ℥ i to ij *of an infusion of* ʒ ij *in* ℔ i *water.*
Quercus cerris gallæ, gr x to ʒ ſs.
Rhamni cathartici baccæ ʒ i to ʒ ij.
succus expressus, ʒ ſs to i.
syrūpus ℥ ſs to iſs.
Rhei palmāti radix, gr x to ℈ ij.
extractum, gr x to ʒ ſs.
infusum ℥ iſs to iv.
pilŭlæ compositæ, gr x to ʒ ſs.
tinctura, ℥ ſs to iſs; *as a stomachic,* ʒ i to ʒij.
composita, ℥ ſs to i ſs
cum aloe, ℥ ſs to i.
cum gentiana, ℥ ſs to i ſs; *or,* ʒ ij to ℥ ſs, *as a stomachic.*
vinum, ℥ ſs to iſs.
Rhŏdŏdendri chrysānthi folia, gr v to x; *or an infusion of* ʒ ij *in* ℥ x *of water.*
Rhi toxĭcodendri folia, gr ſs to gr ij.
Ribis nigri succus spissatus, ℥ ſs to i.
syrupus, ʒ i to ℥ ſs.
Ricĭni communis oleum expressum, ℥ ſs to ℥ i.
Rosæ Gallicæ petala, ℈ i to ʒ i.
conserva, ʒ to ℥.
infūsum, ℥ ij to vj.
mel, ʒ i to ij.
syrūpus, ʒ i to ij.
Rosæ damascēnæ petalā, ℈i to ʒ i.
aqua destillata, ℥ i to iij.

Rosæ damascēnæ syrupus, ʒ ij to ſs.
Rosæ caninæ (Cynosbatus) conserva, ʒ i to ℥ i.
Rosæ caninæ pulpa, ʒ i to ℥ ij.
Roris marīni officinālis summitates, gr x to ℈ ij; *and in infusion* ʒ i to iſs.
oleum volatile, gt ij to gt v.
spiritus, ʒ i to i.
Rŭbiæ tinctōrum radix, ℈ i to ʒ i.
Rŭbi idæi syrupus, ʒ i to ℥ ſs.
Rumĭcis acetōsæ folia, ℥ i to ℥ ij *of the juice.*
Rūtæ grăvĕŏlentis herba, gr xv to ℈ ij.
extractum, gr x to ℈ i.
Sagapēnum, gummi resina, gr x to ʒ ſs.
Salicis cortex, ℈ i to ʒ i.
Salvĭæ officinālis folia, gr xv to ℈ i.
Sambūci nigri cortex interior, gr v to ℈ i.
succus spissatus, ℥ ſs to iſs.
Sapo, gr v to ʒ ſs.
Saponis cum opio pilulæ gr v to gr xv.
Scillæ marĭtĭmæ radix recens, gr v to gr xv.
radix siccāta, gr i to gr iij.
acētum, ʒ ſs to ʒ iſs.
conserva, ʒ ſs to i.
oxymel, ʒ ſs to ij.
mel, ʒ ſs to ij.
pilulæ gr x to ℈ i.
syrūpus, ʒ i to iij.
tinctura, gtt x to xx.
Sināpĕos albæ semina, ʒ i to ℥ ſs.
oleum fixum, ℥ ſs to i.
Sĭi nodiflōri herba, ℥ ij, *or* iij *of the juice.*
Sisymbrĭi nasturtii herba, ʒ i, *or* ij *of the juice.*
Smilācis sărsăparīllæ radix, ℈ i to ʒ i.
decoctum, ℥ iv to ℔ ſs.
compositum, ℥ iv to ℔ ſs.
extractum gr x to ʒ i.
Sodæ carbōnas, gr x to ʒ ſs.
sub-carbōnas gr x to ʒ ſs.
exsiccata gr v to gr xv.
super-carbonātis aqua, ℥ iv to ℔ ſs.
et potassæ tartris, ʒ to ℥.
Sodæ sulphas, ʒ i to ℥ i.
murĭas, ʒ iij to ℥ ſs, *in glysters.*
phosphas, ℥ i to iſs.
sub-boras, gr x to ʒ ſs.
Solāni dulcamāræ stipites, ʒ ſs to ʒ i, *in infusion.*
Solāni decoctum, ℥ ſs to ℥ ij.

Spartĭi scoparĭi summitātes, ℈ i to ʒ i.
extractum, ʒ ſs to i.
Spigēliæ marilandĭcæ radix, ℈ ſs to ℈ i.
Spirĭtus ætheris sulphurĭci composĭtus, ʒ ſs to iſs.
nitrosi, ʒ ſs to ʒ i.
Spongĭa usta, ʒ i to ℥ i.
Stalagmitĭdis cambogiodis succus spissatus (Gambogia) gr i to gr x.
Cambogīæ pilulæ compositæ, gt x to ℈ i.
Stanni pulvis et limatura, ʒ i to ℥ ſs.
Styrăcis officinālis balsămum, gr x to ʒ ſs.
benzoini balsămum, gr x to ʒ ſs.
tinctūra composita, ʒ ſs to i.
Succĭnum præparātum, ℈ i to ʒ i.
Succĭni oleum rectificātum, gt x to xx.
Sulphas alūminæ, ℈ ſs to ℈ i.
Sulphur præcipitātum, ℈ i to ʒ i.
sublimātum lotum, ℈ i to ʒ i.
Sulphuratum oleum, gtt x to ʒ ſs.
Sulphūris trŏchīsci, ʒ i to iij.
Swieteniæ mahāgŏni cortex, ℈ i to ij.
febrifūgæ cortex, ℈ i to ij.
Tamărindi indĭcæ fructus, ℥ ſs to ℥ ii.
infūsum cum cassia senna, ℥ ij to iv.
Tanacēti vulgāris herba, ʒ ſs to i.
Teucrĭi māris herba, gr x to ʒ ſs.
scordĭi herba, ℈ i to ʒ i.
Toluiferæ balsămi balsămum, gt v to ʒ ſs.
syrupus, ʒ i to iij.
tinctura, ʒ ſs to ij.
Tormentillæ erectæ radix, ℈ i to ij.
Tussilăgĭnis farfăræ herba, ʒ ſs to ʒ i, ℥ ij to iv *of the expressed juice.*
Ulmi campestris cortex interior, ℈ i to ʒ i.
decoctum, ℥ iv to ℔ ſs.
Urtīcæ dioicæ herba, ℥ i to ij *of the expressed juice.*
Valeriānæ officinalis radix, ℈ i to ʒ i.
tinctura, ʒ i to ʒ ij.
ammoniata, ʒ i to ʒ ſs.
extractum, gr x to ℈ i.
Verātri albi radix, gr iij to gr x.
tinctura, gt v to x.
Veronicæ beccabungæ herba, ℥ ij to iv *of the juice daily*
Viŏlæ odorātæ syrupus, ʒ i to ij.
Wintĕræ aromaticæ cortex, gr x to ℈ i.
Zinci carbonas, gt x to ʒ i.

Zinci oxĭdum, gr iij to x.
    sulphas, gr v to ʒ ſs.

N. B. These are in general the doses for adults from twenty to sixty, but they may be diminished for children, and people past the prime of life, nearly in the following proportions.

Ages.		Proportionate doses.
Months	2	$\frac{1}{15}$
	7	$\frac{1}{12}$
	14	$\frac{1}{8}$
	28	$\frac{1}{5}$
Years	3	$\frac{1}{4}$
	5	$\frac{1}{3}$
	7	$\frac{1}{2}$
	14	$\frac{2}{3}$
	63	$\frac{11}{15}$
	77	$\frac{5}{6}$
	100	$\frac{5}{6}$

The practice of administering active fluids by drops has been long known to be inacurate; but the extent of the evil has been only lately ascertained, by the accurate experiments of Mr. Shuttleworth, surgeon, of Liverpool. Not only do the drops of different fluids from the same vessel, and of the same fluids from different vessels, differ much in size; but it appears that the drops of the same fluid differ, even to the extent of a third, from different parts of the lip of the same vessel. The custom of dropping active fluids should, therefore, be abolished entirely; and, as weighing is too troublesome and difficult for general use, we must have recourse to small measures, accurately graduated, in the manner of Lane's *drop* measure, and the *grain* measure recommended by the Edinburgh College; but we must not be misled by their names; for they are measures of bulk, not of drops or of grains.

The following table by Mr. Shuttleworth, shews the weight and the number of drops in a measured drachm of several active fluids, in circumstances as nearly similar as possible.

One drachm measure of	Grains.		Drops.	*contained of extract* Grains.
Distilled water weighed,	60	gave	60	
Dr. Fowler's solution of arsenic,	60¼		60	
White wine, - - -	58¾		94	
Ipecacuanha wine, -	59¾		84	2½
Antimonial wine, - -	59¼		84	
Rectified spirits of wine,	51½		151½	
Proof spirit, - - -	55¼		140	
Laudanum, - - -	59½		134	2¾
Tincture of Foxglove, -	58		14	[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Table of Synonimes *of the Medicines, simple and compound, in the Pharmacopœias of London, Dublin, and Edinburgh.*

Edinburgh.	*Dublin.*	*London.*	*Various.*
Acidum Acetosum	Acetum vini	Acetum	
——— destillatum	——— distillatum	Acidum aceticum	
——— forte	Acidum Aceticum		Acetum radicale
——— camphoratum	——— camphoratum		
——— syrupus			
Acetum aromaticum			Acetum prophylacticum
Acidum benzoicum	Acidum benzoicum	Acidum benzoicum	Flores benzoini, *or* Benzoes
Acidum citricum	Acidum citricum crystallis concretum	Acidum citricum	Acidum limonum
Acidum muriaticum	Acidum muriaticum	Acidum muriaticum	Spiritus salis Glauberi seu fumans
	——— dilutum		Spiritus salis communis acidus
Acidum oxy-muriaticum	Aqua oxy-muriatica		
Acidum nitricum		Acidum nitricum	
——— nitrosum	Acidum nitrosum		Spiritus nitri Glauberi seu fumans
——— dilutum	——— dilutum	Acidum nitricum dilutum	Aqua fortis
——— unguentum	——— unguentum		
Acidum succinicum	Acidum succinicum		
Acidum sulphuricum	Acidum sulphuricum	Acidum sulphuricum	Oleum vitrioli
——— dilutum	——— dilutum	Acidum sulphuricum dilutum	Spiritus vitrioli acidus
——— aromaticum			Elixir vitrioli aromaticum
Acipenser huso, &c.	Ichthyocolla		Colla piscium
Aconitum Napellus	Aconitum	Aconitum	Aconitum Neomontanum
——— succus spissatus		Extractum aconiti	
Acorus calamus	Acorus	Calamus	Acorus verus

Edinburgh.	*Dublin.*	*London.*	*Various.*
Æsculus Hippocastanum	Æsculus Hippocastanum		Hippocastanum
Agrimonia Eupatoria	Agrimonia		
Æther nitrosus	Æther nitrosus		Naphtha nitri
Ætheris nitrosi, spiritus	Spiritus æthereus nitrosus	Spiritus ætheris nitrici	Spiritus nitri dulcis
Æther sulphuricus	Æther sulphuricus	Æther sulphuricus	Naptha vitrioli
		Æther rectificatus	
——— cum alcohole	Liquor æthereus sulphuricus	Spiritus ætheris sulphurici	Spiritus vitrioli dulcis
		Oleum æthereum	Oleum vini
	Liquor æthereus oleosus	Spiritus ætheris compositus	Liquor anodynus Hoffmanni
——— aromaticus		Spiritus ætheris aromaticus	Elixir vitrioli dulce
Alcohol	Alcohol	Alcohol	Spiritus vini rectificatissimus
Alcohol	Spiritus vinosus rectificatus	Spiritus rectificatus	
——— dilutum	Spiritus vinosus tenuior	Spiritus tenuior	
——— ammoniatum	Spiritus ammoniæ	Spiritus ammoniæ	Spiritus salis ammoniaci dulcis
——— aromaticum	——— aromaticus	——— aromaticus	Spiritus volatilis oleosus
——— fœtidum	——— fœtidus	——— fœtidus	Spiritus volatilis fœtidus
		——— succinatus	Eau de luce
Allium cepa	Cepa		
Allium sativum	Allium	Allium	
	——— syrupus		
Allium porrum		Porrum	
Aloe socotorina	Aloe socotorina	Aloes spicatæ extractum	Aloe spicata, *Dub.*
——— hepatica	——— hepatica	Aloes vulgaris extractum	Aloe sinuata, *Dub.*
		Decoctum aloes compositum	
		Extractum aloes	
——— pilulæ	——— cum zingibere pilulæ	Pilulæ aloes compositæ	
——— et assæ fœtidæ pilulæ			Pilulæ cocciæ
——— cum colocynthide pilulæ	Colocynthidis pilulæ compositæ		Pilulæ Rufi
——— et myrrhæ pilulæ	Aloes cum myrrha pilulæ	Pilulæ aloes cum myrrha	Hiera picra
	——— cum canella pulvis		Pilulæ aromaticæ

Edinburgh.	*Dublin.*	*London.*	*Variis.*
	Aloes cum guaiaco pulvis	Pulvis aloes compositus	Pilulæ ecophraticæ
Aloe tinctura	—— tinctura	Tinctura aloes	Essentia aloes
—— æthærea			Elixir proprietatis vitriolicum
—— et myrrhæ tinctura	—— tinctura composita	Tinctura aloes composita	Elixir proprietatis
—— vinum	—— vinum	Vinum aloes	Tinctura sacra
Althæa officinalis		Althæa	Bismalva.
—— syrupus		Syrupus althææ	
—— decoctio			
Aluminæ sulphas	Alumen, super-sulphas argillæ alcalisatæ	Alumen, supersulphas aluminæ et potassæ	
—— exsiccatus	—— ustum	Alumen exsiccatum	
—— pulvis compositus			Pulvis stypticus
		Liquor aluminis compositus	Aqua aluminosa Bateana
			Coagulum aluminosum
Amomum repens	Cardamomum minus	Cardamomum	Amomum cardamomum. *Dub.* Elettari cardamomum. *Lond.*
—— tinctura	—— tinctura	Tinctura cardamomi	
	—— composita	—— composita	Tinctura stomachica
Amomum zingiber	Zingiber	Zingiber	Zingiber officinale. *Lond.*
	—— tinctura	Tinctura zingiberis	
—— syrupus	—— syrupus	Syrupus zingiberis	
Amomum zedoaria	Zedoaria		
Ammoniacum	Amoniacum		Heracleum gummiferum. *Lond.*
	—— lac	Mistura ammoniaci	
		Emplastrum ammoniaci	
	—— cum hydrargyro emplastrum	—— cum hydrargyro	Emp. ex ammoniaco cum mercurio
Ammoniæ aqua	Aqua ammoniæ causticæ	Liquor ammoniæ	Spiritus salis ammoniaci cum calce
—— carbonas	Carbonas ammoniæ	Ammoniæ carbonas	Sal volatilis salis ammoniaci
—— carbonatis aqua	{ Aqua carbonatis ammoniæ	Liquor ammoniæ carbonatis	Spiritus salis ammoniaci
	{ Liquor volatilis cornu cervi		Spiritus cornu cervi

Edinburgh.	*Dublin.*	*London.*	*Various.*
Ammoniæ acetitis aqua	Aqua acetatis ammoniæ	Liquor ammoniæ acetatis	Spiritus Mindereri
——— murias	Sal ammoniacum ; Murias ammoniæ	Ammoniæ murias	Ammonia muriata
	Aqua sulphureti ammoniæ		
Ammoniæ hydro-sulphuretum	Hydro-sulphuretum ammoniæ		
Amygdalus communis ; nucleus	Amygdalæ dulces	Amygdala amara, dulcis	
——— ——— oleum	Oleum amygdalarum	Oleum amygdalæ	
		Confectio amygdalæ	
——— ——— emulsio	Amygdalæ lac	Mistura amygdalæ	Emulsio communis
Amyris Gileadensis ; resina liquida			Balsamum Gileadense
Amyris elemifera ; resina	Elemi	Elemi	
	——— unguentum	Unguentum elemi compositum	Balsamus Arcæi
Anchusa tinctoria	Anchusa		
Anethum fœniculum	Fœniculum dulce	Fœniculum	
	——— oleum essentiale		
	——— aqua	Aqua fœniculi	
Anethum graveolens		Anethum	
		Aqua anethi	Aqua seminum anethi
Angelica archangelica			Angelica sativa
		Cusparia	Bonplandia. *Willd.* Cusparia febrifuga. *Lond.*
Angustura	Angustura		
	——— tinctura		
		Infusum cuspariæ	
Anthemis nobilis	Chamæmelum	Anthemis	
——— extractum	——— extractum	Extractum anthemidis	
		Oleum anthemidis	
		Infusum anthemidis	
——— decoctum	——— dococtum compositum	Decoctum malvæ compositum	Decoctum commune pro clystere
	Enema catharticum		
Anthemis pyrethrum	Pyrethrum	Pyrethrum	
Antimonii sulphuretum	Sulphuretum antimonii	Antimonii sulphuretum	Stibium

Edinburgh.	*Dublin.*	*London.*	*Various.*
Antimonii sulphuretum præparatum	Sulphuretum antimonii præparatum		
——— præcipitatum	Sulphur antimoniatum fuscum	Antim. sulphuretum præcipitatum	Sulphur aurat. antim. Kermes minerale
——— oxidum cum sulph. vitrif.			Vitrum antimonii
——— vitrificatum cum cera			Vitrum antimonii ceratum
——— per nitrat. potassæ			Crocus metallorum
——— cum phosphate calcis	Pulvis antimonialis	Pulvis antimonialis	Pulvis Jacobi
——— murias			Butyrum ant. Causticum ant.
	Oxydum antimonii nitro-muriaticum	Antimonii oxydum	Pulvis Algarothi
——— tartris	Tartarum antimoniatum	Antimonium tartarizatum	Tartarus emeticus
——— vinum		Liquor antimonii tartarizati	Vinum antimoniale
Apium petroselinum			
Aqua destillata	Aqua distillata	Aqua distillata	
Arbutus uva ursi	Uva ursi		
Arctium lappa	Bardana		Lappa major
Argentum	Argentum	Argentum	
——— nitras	Nitras argenti	Argenti nitras	Causticum lunare
Aristolochia serpentaria	Serpentaria virginiana	Serpentaria	
——— tinctura	——— tinctura	Tinctura serpentariæ	
Arnica montana	Arnica		Doronicum Germanicum
Aromaticum electuarium	Electuarium aromaticum	Confectio aromatica	Confectio cardiaca
Aromaticus pulvis	Pulvis aromaticus	Pulvis cinnamomi compositus	Species aromaticæ
Arsenici oxidum	Arsenici oxydum album	Arsenici oxydum	Arsenicum album
		——— præparatum	
	Arsenias kali		
		Liquor arsenicalis	Solutio mineralis Fowleri
Artemisia abrotanum	Abrotanum		
Artemisia Absinthium	Absinthium vulgare	Absinthium	
	——— extractum		
Artemisia maritima	——— maritimum		Semen cinæ, seu contra.
Artemisia santonica	Santonicum		

Edinburgh.	*Dublin.*	*London.*	*Various.*
Arum maculatum	Arum		Aron.
Asarum Europæum	Asarum	Asarum	
——— pulvis compositus	——— pulvis compositus		Pulvis sternutatorius
Astragalus tragacantha, gummi	Tragacantha	Tragacantha	Astragalus verus. *Lond.*
——————— mucilago	——— mucilago		
		Pulvis tragacanthæ compositus	
Atropa belladonna	Belladonna	Belladonna	Solanum lethale
——————— succus spissatus		Extractum belladonnæ	
Avena sativa		Avena	
Barytæ carbonas			Barytes. Terra ponderosa
——— murias			
——————— solutio			
——— sulphas			Terra pond. vitriol. Spathum pond.
Bitumen petroleum	Petroleum Barbadense	Petroleum	Oleum petræ
Boletus igniarius			Agaricus chirurgorum.
Bubon galbanum	Galbanum	Galbanum	
	——— tinctura		
		Pilulæ galbani compositæ	Pilulæ gummosæ
Emplastrum gummosum	——— emplastrum	Emplastrum galbani compositum	Emplastrum commune cum gummi
Calx	Calx recens usta	Calx	Calx viva
Calcis aqua	Aqua calcis	Liquor calcis	Aqua calcis simplex. Solutio calcis
——— linimentum	Linimentum calcis		Oleum lini cum calce
——— carbonas *a* creta alba	Creta, carbonas calcis	Creta	
——— *b* marmor album		Lapis calcareus	
——— præparatus	——— præparata	Creta præparata	
	——— præcipitata		
——— potio	——— mistura	Mistura cretæ	Julepum e creta, Potio cretacea
——— trochisci			Tabellæ cardialgicæ
——— pulvis compositus		Pulvis cretæ compositus	Pulvis e bolo comp. Pulv. cretaceus
		——— cum opio	——— cum opio
——— muriatis-solutio	Aqua muriatis calcis		

Edinburgh.	*Dublin.*	*London.*	*Various.*
Cancer pagurus	Cancer		
Canella alba	Canella alba	Canella alba	Costus corticosus
Capiscum annuum	Capsicum	Capsicum	
		Tinctura capsici	
Carbo ligni	Carbo ligni	Carbo ligni	
Cardamine pratensis	Cardamine	Cardamine	
Carum carui	Caruon	Carui	Carvi
——— spiritus	——— spiritus	Spiritus carui	Aqua carvi spirituosa
	——— oleum essentiale	Oleum carui	
		Aqua carui	
Caryophyllus aromaticus	Caryophyllus aromatica	Caryophylli	Eugenia caryophyllata. *Dub. Lond.*
		Caryophylli oleum	
		Infusum caryophyllorum	
Cassia fistula	Cassia fistularis	Cassiæ pulpa	Diacassia
——— electuarium	——— electuarium	Confectio cassiæ	
——— senna	Senna	Senna	
——— tinctura composita	——— tinctura	Tinctura sennæ	Elixir salutis
——— electuarium	——— electuarium	Confectio sennæ	Electuarium lenitivum
——— extractum			
	——— syrupus	Syrupus sennæ	
	——— infusum	Infusum sennæ	Infusum senæ commune
		Pulvis sennæ compositus	
Castor fiber; castoreum	Castoreum rossicum	Castoreum	
——— tinctura	——— tinctura	Tinctura castorei	
——— composita			
	Castoreum canadense		
	——— tinctura		
Centaurea benedicta	Carduus benedictus		

Edinburgh.	*Dublin.*	*London.*	*Various.*
Cera alba	Cera alba	Cera alba	Apis mellifica. *Dub.*
Linimentum simplex			
Unguentum simplex	——— unguentum		Unguentum album
Cera flava	—— flava	Cera flava	
	——— purificata		
	——— unguentum	Ceratum	
		Emplastrum ceræ	Emplastrum attrahens
Cervus elaphus, cornu	Cornu cervinum	Cornua	
		Cornu ustum	
	Cornu cervini decoctum	Mistura cornu usti	Decoctum album
	——— pulvis	Pulvis cornu usti cum opio	
	——— liquor volatilis		Spiritus cornu cervi
	——— oleum		Oleum cornu cervi fœtidum
	——— rectificatum		——— e cornubus
Chironia centaurium	Centaureum minus		
Cinara scolymus			Cinara hortensis
Cinchona caribæa			
Cinchona officinalis	Cinchona ; Cortex Peruvianus	Cinchona	
——— *a* communis		Cinchona lancifolia	
——— *b* flavus		——— cordifolia	
——— c ruber		——— oblongifolia	
——— extractum	——— extractum	Extractum cinchonæ	
	——— rubræ extractum resinosum	——— cinchonæ resinosum	
——— decoctum	——— decoctum	Decoctum cinchonæ	Decoctum corticis Peruviani
——— infusum	——— infusum sine calore	Infusum cinchona	
——— tinctura	——— tinctura	Tinctura cinchonæ	Tinctura corticis Peruviani
	——— composita	——— composita	Elixir antihypochondriacum

Edinburgh.	*Dublin.*	*London.*	*Various.*
Citrus aurantium	Aurantium Hispalense	Aurantium	Mala aurantia
——— ——— aqua distillata			
		Infusum aurantii compositum	
——— ——— conserva	——— conserva	Confectio aurantii	Conserva flavedinis cort. aur.
	——— tinctura	Tinctura aurantii	Tinctura corticis aurantii
——— ——— syrupus	——— syrupus	Syrupus aurantii	Syrupus e corticibus aurantiorum
Citrus medica, fructus	Limon	Limones	
——— ——— aqua distillata			
——— ——— syrupus	——— syrupus	Syrupus limonis	Syrupus e succo citriorum
Coccus cacti	Coccinella	Coccus	
Cochlearia armoracia	Raphanus rusticanus	Armoracia	
	——— spiritus compositus	Spiritus armoraciæ compositus	Aqua raphani composita
		Infusum armoraciæ compositum	
Cochlearia officinalis	Cochlearia		
——— succus compositus			Succi ad scorbuticos
Cocos butyracea, oleum fixum			Oleum palmæ
Colchicum autumnale	Colchicum	Colchicum	
	——— oxymel		
——— ——— syrupus			
		Acetum colchici	
Colomba	Colombo	Calumba	
		Infusum calumbæ	
——— tinctura	——— tinctura	Tinctura calumbæ	
Conium maculatum	Cicuta	Conium	
——— ——— succus spissatus	——— succus spissatus	Extractum conii	
Convolvulus scammonia	Scammonium	Scammoneæ gummi resina	Diagrydium
——— pulvis compositus		Pulvis scammoneæ comp.	Pulvis comitis Warwicensis
	——— electuarium	Confectio scammonii	Electarium caryocostinum
Convolvulus jalapa	Jalapa	Jalapa	Mechoacanna nigra

Edinburgh.	*Dublin.*	*London.*	*Various.*
Convolvuli jalapæ extractum	Jalapæ extractum	Extractum jalapæ	Extractum jalapii
	——— resinosum		
——— tinctura	——— tinctura	Tinctura jalapæ	Tinctura jalapii
——— pulvis compositus			
Copaifera officinalis, resina liquida	Balsamum copaibæ	Copaiba	Balsamum Brasiliense
Coriandrum sativum	Coriandrum	Coriandrum	
Crocus sativus	Crocus	Croci stigmata	Crocus Anglicus
		Syrupus croci	
——— tinctura	——— tinctura		
Croton eleutheria	Cascarilla	Cascarilla	Croton cascarilla. *Dub. Lond.* Clutia eleutheria. *Linn.*
	——— tinctura	Tinctura cascarillæ	
	——— extractum resinosum		
		Infusum cascarillæ	
Cucumis colocynthis	Colocynthis	Colocynthidis pulpa	
		Extractum colocynthidis	
	——— extractum compositum	Extractum colocynthidis comp.	Extractum catharticum. Pil. rudii
Cuminum cyminum		Cuminum	
		Emplastrum cumini	Emplastrum e cymino
Cuprum	Cuprum		
——— subacetis	Ærugo, subacetas cupri	Ærugo	Viride æris
	——— præparata		
	——— oxymel	Linimentum æruginis	Mel Ægyptiacum
——— unguentum	——— unguentum		
——— ammoniaretum	Cuprum ammoniatum	Cuprum ammoniatum	Cuprum ammoniacum
——— pilulæ			
	——— aqua	Liquor cupri ammoniati	Aqua sapphirina
——— sulphas	Sulphas cupri	Cupri sulphas	Cuprum vitriol. Vitr. cœruleum
——— solutio composita			Aqua styptica
Daphne mezereum	Mezereon	Mezereum	Laureola; cocognidium

Edinburgh.	*Dublin.*	*London.*	*Various.*
Daphnes mezerei decoctum			
Datura stramonium	Stramonium		
Daucus carota	Daucus sylvestris	Daucus	Carota
Delphinium staphisagria	Staphisagria	Staphisagria	
Dianthus caryophyllus	Caryophyllum rubrum		Caryophylla rubra
——— ——— syrupus	——— syrupus		
Digitalis purpurea	Digitalis	Digitalis	
	——— decoctum		
——— ——— tinctura	——— tinctura	Tinctura digitalis	
——— ——— infusum			
Dolichos pruriens	Dolichos	Dolichos	
Dorstenia contrajerva		Contrajerva	
		Pulvis contrajervæ comp.	Lapis contrayervæ
Eryngium maritimum	Eryngium		
Euphorbii officinalis gummi resina		Euphorbium	
Ferrum	Ferrum		Chalybs
——— limatura purificata			Ferrum alcoholisatum
——— carbonas præparatus	Rubigo ferri		Chalybis rubigo præparata
——— ——— præcipitatus	Carbonas ferri	Ferri carbonas	
		Mistura ferri composita	Mistura myrrhæ Griffiths
		Pilulæ ferri cum myrrha	
——— oxidum nigrum purificatum	Oxydum ferri nigrum		Squamæ ferri purificatæ
——— sulphas	Sulphas ferri	Ferri sulphas	Sal martis, vitr. viride. Sal chalybis
——— ——— exsiccatus	——— exsiccatum		Vitriolum calcinatum
——— oxidum rubrum	Oxydum ferri rubrum		Colcothar vitrioli
——— ——— emplastrum	Emplastrum thuris		Emplastrum roborans
——— muriatis tinctura	Tinctura muriatis ferri	Tinctura ferri muriatis	Tinctura martis in spiritu salis
	——— ——— cum oxydo rubro		Tinctuara martis aurea.
——— et ammoniæ murias	Murias ammoniæ et ferri	Ferrum ammoniatum	Flores martiales
		Tinctura ferri ammoniati	Tinctura florum martialum

Edinburgh.	*Dublin.*	*London.*	*Various.*
	Tartarum ferri	Ferrum tartarizatum	Mars solubilis. Tartarus martialis
	Vinum ferri	Vinum ferri	Vinum chalybeatum. Vin. martis
	Acetas ferri		Extractum martis
	Tinctura acetatis ferri		
	Tinctura acetatis ferri cum alcohol		
	Sulphuretum ferri		
		Liquor ferri alkalini	
Ferula assa fœtida	Assa fœtida	Assæfœtidæ gummi resina	
	—— lac	Mistura assafœtidæ	
——— tinctura	—— tinctura	Tinctura assafœtidæ	Tinctura fœtida
	Enema fœtidum		
——— pilulæ compositæ	Pilulæ myrrhæ compositæ		Pilulæ gummosæ
——— emplastrum			Emp. antihystericum
Ficus carica	Carica	Carica	
Fucus vesiculosus	Quercus marina	Fucus	
	——— pulvis	Manna	Æthiops vegetabilis
Fraxinus ornus ; Manna	Manna		Manna calabrina
Gambogia	Gambogia	Cambogia	Stalagmitis gambogioides. *L. D.* Gummi guttæ
		Pilulæ gambogiæ comp.	
Gentiana lutea	Gentiana	Gentiana	Gentiana rubra
——— extractum	——- extractum	Extractum gentianæ	
——— infusum	——- infusum compositum	Infusum gentianæ comp.	Infusum amarum simplex
——— tinctura composita	——- tinctura composita	Tinctura gentianæ comp.	Tinctura amara, Elixir stomachicum
——— vinum compositum			Vinum amarum
Geoffræa inermis	Geoffrœa		Geoffroya inermis. *Dub.*
——— decoctum			
Geum urbanum	Geum urbanum		Caryophyllata
Glycyrrhiza glabra	Glycyrrhiza	Glycyrrhiza	Radix liquiritiæ
——— extractum	——- extractum	Extractum glycyrrhizæ	Succus liquiritiæ depuratus

Edinburgh.	*Dublin.*	*London.*	*Various.*
Glycyrrhizæ glabræ trochisci			Trochisci bechici nigri
—————— cum opio			
Gratiola officinalis	Gratiola		
Guaiacum officinale	Guaiacum	Guaiacum	Lignum sanctum
——— tinctura	——— tinctura	Tinctura guaiaci	Elixir guaiacinum
——— ammoniata	——— ammoniata	——— ammoniata	Elixir guaiacinum volatile
——— decoctum compositum	Aqua calcis compositum		Decoctum lignorum
		Mistura guaiaci	Lac guaiaci
Hæmatoxylum campechianum	Hæmatoxylum	Hæmatoxylon	Lignum Campechense
——— extractum	——— extractum	Extractum hæmatoxyli	Extractum ligni Campechensis
Helleborus niger	Helleborus niger; melampodium	Helleborus niger	Melampodium
——— extractum	——— extractum		Extractum melampodii
——— tinctura	——— tinctura	Tinctura hellebori nigri	Tinctura melampodii
Helleborus fœtidus	Helleboraster	Helleborus fœtidus	
Hirudo medicinalis	Hirudo medicinalis		
Hordeum distichon	Hordeum distichum	Hordeum	
——— decoctum	——— decoctum	Decoctum hordei	Aqua hordeata
	——— compositum	——— compositum	Decoctum pectorale
		Cerevisiæ fermentum	
		Cataplasma fermenti	
Humulus lupulus		Humulus	
		Extractum humuli	Extractum lupuli
		Tinctura humuli	
Hydrargyrus	Hydrargyrum	Hydrargyrus	Argentum vivum; Mercurius
——— purificatus	——— purificatum	——— purificatus	
——— pilulæ	——— pilulæ	Pilulæ hydrargyri	Pilulæ cœruleæ
Hydrargyri emplastrum		Emplastrum hydrargyri	Emp. lithargyri cum hydrarg.
——— unguentum	Hydrargyri unguentum	Unguentum hydrargyri fortius	Unguentum cœruleum fortius
	——— mitius	——— mitius	——— mitius
		Linimentum hydrargyri	
	Hydrargyrum cum magnesia		
	——— creta	Hydrargyrus cum creta	Mercurius alkalisatus

Edinburgh.	*Dublin.*	*London.*	*Varicus.*
Hydrargyri acetis	Acetas hydrargyri		
——— ——— murias	Murias hydrargyri corrosivum	Hydrargyri oxymurias	Mercurius corrosivus sublimatus
		Liquor hydrargyri oxymuriatis	Liquor bellostii
——— sub-murias	Sub-murias hydrargyri sublimatum	Hydrargyri sub-murias	Calomelas. Panacea merc.
		Pilulæ hydrargyri sub-muriatis	Pilulæ plummeri
——— ——— præcipitatus	——— ——— præcipitatum		——— præcipitatus dulcis
	——— ——— ammoniatum	Hydrargyrus præcipitatus albus	Mercurius cosmeticus
	——— ——— unguentum		Unguent. c mercurio præcip.
——— oxidum cinereum	Pulvis hydrargyri cinereus	Hydrargyri oxydum cinereum	Mercurius solubilis
——— ——— unguentum			
	Oxydum hydrargyri	——— oxydum rubrum	Mercurius calcinatus
——— rubrum per acidum nitricum	——— ——— nitricum	——— nitrico-oxydum	——— præcipitatus ruber
——— ——— rubri unguentum	Sub-nitratis hydrargyri unguentum	Unguentum hydrargyri nitr. oxydi	
——— nitratis ung. fortius	Super-nitratis hydrargyri unguent.	——— ——— nitratis	Unguentum citrinum
——— ung. mitius			
——— sub-sulphas flavus	Oxydum hydrargyri sulphuricum		Turpethum miner. Merc. emet. flav.
——— sulphuretum nigrum	Sulphuretum hydrargyri nigrum		Æthiops mineralis; Pulv. hypnot.
——— sulphuretum rubrum	——— hydrargyri rubrum	Hydrargyri sulphuretum rubrum	Cinnabaris factitia
Hyosciamus niger	Hyosciamus	Hyosciamus	
——— succus spissatus	——— succus spissatus	Extractum hyosciami	
——— tinctura	——— tinctura	Tinctura hyosciami	
Hyssopus officinalis	Hyssopus		
Inula helenium	Enula campana		
Ipecacuanha	Ipecacuanha	Ipecacuanha	Callicocca, *or* cephaëlis ipecacuanha
Ipecacuanhæ et opii pulvis	Ipecacuanhæ pulvis compositus	Pulvis ipecacuanhæ comp.	Pulvis Doveri
——— vinum	——— ——— vinum	Vinum ipecacuanhæ	
Iris Florentina			
Juniperus communis	Juniperus	Juniperus	

Edinburgh.	*Dublin.*	*London.*	*Various.*
Juniperi spiritus compositus	Juniperi spiritus compositus	Spiritus juniperi compositus	Aqua juniperi composita
——— oleum volatile	——— oleum essentiale	Oleum juniperi	
Juniperus lycia, resina	Olibanum	Olibanum	Thus
——— sabina	Sabina	Sabina	
——— oleum volatile	——— oleum essentiale		
	——— extractum		
	——— unguentum	Ceratum sabinæ	
Kino	Kino	Kino	{ Eucalyptus resinifera, *Ed.*;
——— tinctura	——— tinctura	Tinctura kino	{ Butea frondosa, *Dub.*
		Pulvis kino comp.	
Lactuca virosa			Lactuca sylvestris
——— succus spissatus			
Lavandula spica	Lavandula	Lavandula	
——— spiritus	——— spiritus	Spiritus lavandulæ	Spiritus lavend. simp.
——— compositus	——— compositus	——— compositus	
——— oleum volatile	——— oleum essentiale	Oleum lavandulæ	Oleum spicæ
Laurus camphora; camphora	Camphora	Camphora	
Tinctura camphoræ	Spiritus camphoratus	Spiritus camphoræ	Spiritus vinosus camphoratus
Emulsio camphorata	Mistura camphorata	Mistura camphoræ	Julepum e camphora
Oleum camphoratum	Oleum camphoratum	Linimentum camphoræ	
		——— comp.	Linimentum camphoræ
Laurus cassia	Cassia lignea		Xylocassia. Can. Malab.
——— aqua destillata			
Laurus cinnamomum	Cinnamomum	Cinnamomum	Cannella
——— aqua destillata	——— aqua	Aqua cinnamomi	Aqua cinnamomi simplex
		——— oleum	
——— spiritus	——— spiritus	Spiritus cinnamomi	Aqua cinnamomi spirituosa
——— tinctura	——— tinctura	Tinctura cinnamomi	
——— composita	——— composita	——— composita	Tinctura aromatica
Laurus nobilis		Laurus	

Edinburgh.	*Dublin.*	*London.*	*Various*
Laurus sassafras	Sassafras	Sassafras	
———— oleum volatile	———— oleum essentiale		
Leontodon taraxacum	Taraxacum	Taraxacum	Dens leonis
	———— extractum	Extractum taraxaci	
Lichen Islandicus	Lichen islandicus	Lichen	Muscus Islandicus
	———— decoctum	Decoctum lichenis	
Lichen rocella	Litmus		Lacmus tinctorius
Linum usitatissimum	Linum	Linum usitatissimum	
———— oleum	———— oleum	Oleum lini	
		Infusum lini	
Linum catharticum	Linum catharticum	Linum catharticum	
Lobelia syphilitica			
Lythrum salicaria	Lythrum salicaria		
Magnesia	Magnesia usta	Magnesia	
———— carbonas	Magnesia	Magnesiæ carbonas	
———— sulphas	Sulphas magnesiæ	———— sulphas	Sal catharticum amarum
Malva silvestris		Malva	
Manganesium	Manganesium		Magnesia vitriariorum
Mel	Mel	Mel	
	---- despumatum	——— despumatum	
	Oxymel	Oxymel	Oxymel simplex
Marrubium vulgare	Marrubium album	Marrubium	
Melaleuca leucadendron, oleum	Oleum cajeput	Cajuputi oleum	Melaleuca cajuputi *Lond.*
Melissa officinalis			
Meloe vesicatorius	Cantharis	Lytta	Lytta vesicatoria. *Lond.*
———— tinctura	———— tinctura	Tinctura lyttæ	
———— pulveris unguent.	———— unguentum	Ceratum lyttæ	Unguentum epispasticum fortius
———— infusi unguentum			Unguentum epispasticum mitius
———— emplastrum	Cantharidis emplastrum	Emplastrum lyttæ	Emplastrum vesicatorium

Edinburgh.	*Dublin.*	*London.*	
Meloes vesicatorii emplast. comp.	Emplastrum calefaciens		
Mentha piperita	Mentha piperitis	Mentha piperita var. *a.*	
——— aqua destillata	——— aqua	Aqua menthæ piperitæ	Aqua menth. pip. simplex
——— spiritus		Spiritus menthæ piperitæ	——————— spirituosa
——— oleum volatile	——— oleum essentiale	Oleum menthæ piperitæ	
Mentha pulegium	Pulegium	Pulegium	
——— aqua destillata	———-- aqua	Aqua pulegii	
	———-- oleum essentiale	Oleum pulegii	
		Spiritus pulegii	
Mentha viridis	Mentha sativa	Mentha viridis	
	——— oleum essentiale	Oleum menthæ viridis	
	——— aqua	Aqua menthæ viridis	Aqua menthæ vulgaris simplex
		Spiritus menthæ viridis	——— ——————— spirituosa
	——— infusum compositum		
Menyanthes trifoliata	Trifolium paludosum	Menyanthes	Trifolium palustre
Mimosa catechu, extractum	Catechu	Catechu extractum	Acacia catechu. *L.* Terra Japonica
——— electuarium	——— electuarium compositum		Confectio Japonica
——— tinctura	——— tinctura		Tinctura Japonica
——— infusum		Infusum catechu	Infusum Japonicum
Mimosa nilotica, gummi	Gummi arabicum	Acaciæ gummi	Acacia vera. *L.* Gummi Senegal
——— ——— mucilago	———-- mucilago	Mucilago acaciæ	
——————— emulsio	Emulsio arabica		
Momordica elaterium	Cucumis agrestis	Elaterii poma	
——— ——— succus spissatus	Elaterium	Extractum elaterii	
Morus nigra		Morus	
		Syrupus mori	
Moschus moschiferus; Moschus	Moschus	Moschus	
	———- tinctura	Mistura moschi	Julepum e moscho

Edinburgh.	*Dublin.*	*London.*	*Various.*
Myristica moschata ; Nux moschata	Nux moschata	Myristicæ nuclei	
——— spiritus	——— spiritus	Spiritus myristicæ	Aqua nucis moschatæ spirituosa
Myroxylon Peruiferum ; Balsamum	Balsamum Peruvianum	Balsamum Peruvianum	Balsamum Indicum nigrum
Myrrha	Myrrha	Myrrha	
——— tinctura	——— tinctura	Tinctura myrrhæ	
Myrtus pimenta	Pimento ; Piper Jamaicense	Pimentæ baccæ	Piper Jamaicense
——— aqua destillata	——— aqua	Aqua pimentæ	Aqua pimentæ spirituosa
——— spiritus	——— spiritus	Spiritus pimentæ	
——— oleum volatile	——— oleum essentiale	Oleum pimentæ	
Nicotiana tabacum	Nicotiana	Tabacum	
——— vinum			
		Infusum tabaci	
Olea Europæa ; oleum	Oleum olivarum	Olivæ oleum	
Oleum ammoniatum	Ammoniæ linimentum	Linimentum ammoniæ fortius	
		——— carbonatis	Linimentum volatile
Oleum sulphuratum		Oleum sulphuratum	Balsamum sulphuris crassum
Oniscus asellus	Millepedæ		
Opium	Opium	Opium	
	——— extractum aquosum	Extractum opii	Extract. thebaicum. Opium colatum
	——— purificatum		
——— tinctura	——— tinctura	Tinctura opii	Tinctura thebaica. Laudan. liquidum
——— ammoniata			Elixir paregoricum. *Ed.*
	——— tinctura camphorata	——— camphoræ composita	——— paregoricum *Lond. Dub.*
	——— syrupus		
		Emplastrum opii	
		Vinum opii	Laudanum liquidum Sydenhami
Electuarium opiatum		Confectio opii	Philonium Londinense
Pilulæ opiatæ	Pilulæ e styrace	Pilulæ saponis cum opio	Pilulæ thebaicæ
Pulvis opiatus			

Edinburgh.	*Dublin.*	*London.*	*Various.*
Origanum majorana	Majorana		
Origanum vulgare	Origanum	Origanum	
	——— oleum essentiale	Oleum origani	
Ostrea edulis		Ostrea	
	Ostrearum testæ præparatæ	Testæ præparatæ	
Oxalis acetosella		Acetosella	Lujula
Ovis aries; sevum	Sevum ovillum	Sevum	
		Sevum præparatum	
Papaver somniferum	Papaver album	Papaveris capsulæ	
——— extractum		Extractum papaveris	
——— syrupus	——— syrupus	Syrupus papaveris	Syrupus diacodion; Syr. e meconio
		Decoctum papaveris	
Papaver rhoeas	Papaver erraticum	Rhœados petala	
	——— syrupus	Syrupus rhœados	
Pastinaca opoponax; gummi resina		Opoponax	
Phasianus gallus		Ovum	
	Ovorum testæ præparatæ		
Pimpinella anisum	Anisum	Anisum	
——— oleum volatile	——— oleum essentiale	Oleum anisi	
	——— spiritus compositus	Spiritus anisi	
Pinus abies, resina sponte concreta	Pix Burgundica	Pix arida	
		Picis aridæ unguentum	Unguentum basilicum nigrum
	Emplastrum aromaticum	Emplastrum picis compositum	Emplastrum cephalicum
		Abietis resina	Thus
Pinus balsamea, resina liquida	Balsamum Canadense	Terebinthina canadensis	
—— larix, resina liquida	Terebinthina Veneta		
—— sylvestris, resina empyreum.	Pix liquida	Pix liquida	
Picis unguentum	——— unguentum	Picis liquidæ unguentum.	

Edinburgh.	*Dublin.*	*London.*	*Various.*
	Picis liquidæ aqua		
	Terebinthina vulgaris	Terebinthina vulgaris	
		Linimentum terebinthinæ	
Pini oleum volatile	Oleum terebinthinæ	Terebinthinæ oleum	
—— purissimum	—— rectificatum	Oleum terebinthinæ rectificatum	Oleum tereb. æthereum
Pini resina	Resina flava; resina alba	Resina flava	Resina alba, *Edin.* Colophonium
Emplastrum simplex		Emplastrum ceræ	Emp. cereum. Cerat. citrin.
Unguentum resinosum	Unguentum resinæ albæ	Ceratum resinæ	Ungt. basilicum flavum
Emplastrum resinosum	Litharg. cmp. cum resina	Emplastrum resinæ	Emplastrum adhæsivum
Piper longum	Piper longum	Piper longum	
Piper nigrum	Piper nigrum	Piper nigrum	
	—— unguentum		
Pistacia terebinthus		Terebinthina Chia	
Pistacia lentiscus, resina		Mastiche	
Plumbum			
—— oxidum album	Cerussa; sub-acetas plumbi.	Plumbi carbonas	Sub-carbonas plumbi.
—— unguentum	—— sive sub-acetatis plumbi unguentum		Unguentum album
—— oxidum semi-vitreum	Lythargyrum	Plumbi oxydum semi-vitreum	Plumbum ustum
—— emplastrum	Lithargyri emplastrum	Emplastrum plumbi	Diachylon simplex
	Liquor sub-acetatis lithargyri	Liquor plumbi acetatis	Extractum saturni
		—— dilutus	
		Ceratum plumbi comp.	
	Lithargyri sub-acetatis liquor comp.		
—— acetis	Acetas plumbi	Plumbi super-acetas	Saccharum saturni
—— acetetitis unguentum	Acetitis plumbi unguentum	Ceratum plumbi super-acetatis	Unguentum saturninum
—— oxidum rubrum			Plumbum ustum rubrum
Polyala senega	Seneka	Senega	
—— decoctum		Decoctum senegæ	

Edinburgh.	*Dublin.*	*London.*	*Various.*
Polygonum bistorta	Bistorta	Bistorta	
Polypodium filix mas	Filix mas	Filix	Aspidium filix mas. *Lond.*
Potassa	Kali causticum	Potassa fusa	Alkali vegetabile fixum causticum
——— cum calce	——— cum calce	——— cum calce	Causticum commune mitius
——— aqua	——— aqua	Liquor potassæ	Lixivium saponarium causticum
——— carbonas	—— sub-carbonas	Potassæ subcarbonas	Sal absinthii
——— ——— purissimus	—— e tartaro	——— ——— ex tartaro	Sal tartari
——— ——— impurus	Cineres clavellati ; kali impurum	Potassa impura	Lixiva, Alk. fix. veget.
	Aqua sub-carbonatis kali	Liquor potassæ subcarbonatis	Lixivium tartari
		Potassæ carbonas	
——— super-carbonatis aqua			
——— acetis	Kali acetas	——— acetas	Sal diureticus
——— sulphas	—— sulphas	——— sulphas	— de duobus. Arcanum duplicatum
——— ——— cum sulphure			— polychrestus glaseri
		——— supersulphas	
——— sulphuretum	—— sulphuretum	——— sulphuretum	Hepar sulphuris
	——— ——— aqua		
——— tartris	—— tartaras	——— tartras	Tartarum solub.
——— et sodæ tartris	Tartaras sodæ et kali	Soda tartarizata	Sal rupellensis. Sal polych. seignette
——— super-tartris	Crystalli tartari	Potassæ supertartras	Tartarus purificatus
——— ——— impurus	Tartarum		——— crudus
——— nitras	Nitrum, nitras kali	——— nitras	Nitrum prismaticum
——— trochici			
	Aqua alcalina oxymuriatica		Aqua oxymuriatis potassæ
Prunus domestica	Prunus Gallica	Pruna (drupa siccata)	
Pterocarpus draco, resina			Sanguis draconis

Edinburgh.	*Dublin.*	*London.*	*Various.*
Pterocarpus santalinus	Santalum rubrum	Pterocarpi lignum	
Punica granatum	Granatum	Granatum	Balaustium
Pyrus cydonia		Cydoniæ semen	Cotonea
		Decoctum cydoniæ	Mucilago cydoniorum
Quassia excelsa	Quassia	Quassia	
	——— tinctura		
		Infusum quassiæ	
Quassia simaruba	Simarouba	Simarouba	
		Infusum simaroubæ	
Quercus cerris, cyniphis nidus	Gallæ	Gallæ	Cynipidum nidi, Cynips quercus folii
	——- tinctura		
——— robur	Quercus	Quercus	Quercus pedunculata. *Lond.*
		Decoctum quercus	
	——— extractum		
Rhamnus catharticus	Rhamnus catharticus	Rhamnus	Spina cervina
——————— syrupus		Syrupus rhamni	Syrupus domesticus
Rheum palmatum	Rheum	Rheum	Rhabarbarum
——————- tinctura	—— tinctura	Tinctura rhei	Tinctura rhabarbari spirituosa
——— et aloes tinctura			Elixir sacrum
——— et gentianæ tinctura			Tinctura rhei amara
——— infusum		Infusum rhei	
——— vinum			——- rhabarbari vinosa
——— pilulæ compositæ			Pilulæ stomachicæ
		Extractum rhei	
Rheum undulatum	Rheum undulatum	Tinctura rhei composita	Extractum rhei aquosum
Rhododendron chrysanthum			
Rhus toxicodendron		Toxicodendron	Toxicodendron
Ricinus communis	Ricinus	Ricinus	Palma christi. Cataputia major
		Oleum ricini	Oleum de kerva. Ol. palmæ liquidum

Edinburgh.	*Dublin.*	*London.*	*Various.*
Rosa canina		Rosa canina	Cynosbatus
——— conserva		Confectio rosæ caninæ	Conserva fructus cynosbati
—— centifolia	Rosa damascena	Rosa centifolia	Rosa pallida
——— aqua destillata	—— aqua	Aqua rosæ	
——— syrupus		Syrupus rosæ	Syrupus rosarum solutivus
—— Gallica	Rosa rubra	Rosa Gallica	
	—— mel	Mel rosæ	Mel rosaceum
——— conserva	—— conserva	Confectio rosæ gallicæ	
——— infusum	—— infusum	Infusum rosæ	Tinctura rosarum
——— syrupus			
Rosmarinus officinalis	Rosmarinus	Rosmarinus	
——— spiritus	——— spiritus	Spiritus rosmarini	
——— oleum volatile	——— oleum essentiale	Oleum rosmarini	
Rubia tinctorum	Rubia	Rubia	
Rumex aquaticus	Rumex aquaticus		Britannica; Hydolapathum
—— acetosa		Acetosa	
Ruta graveolens	Ruta		
——— extractum	—— extractum		
	—— oleum essentiale		Oleum rutæ æthereum
		Confectio rutæ	Electarium e baccis lauri
Saccharum officinarum	Saccharum	Saccharum	
Syrupus simplex	Syrupus simplex	Syrupus	Syrupus communis
Sagapenum	Sagapenum	Sagapenum	Serapinum
Salix alba	Salix		
—— *fragilis*	Salix fragilis		
—— *caprea*		Salix caprea	
Salvia officinalis	Salvia		Herba salviæ minoris
Sambucus nigra	Sambucus	Sambucus	
	——— unguentum	——— unguentum.	
——— succus spissatus	——— succus spissatus		Roob baccarum sambuci

Edinburgh.	*Dublin.*	*London.*	*Various.*
Sapo albus Hispanus	Sapo durus Hispanicus	Sapo durus	Sapo ex olivæ oleo et soda confectus
		Ceratum saponis	
—— tinctura	Saponis linimentum	Linimentum saponis compositum.	Balsamum saponaceum
—— et opii tinctura			———— anodynum
Emplastrum saponaceum	——— emplastrum	Emplastrum saponis	Emplastrum e sapone
		Sapo mollis	Sapo ex oleo et potassa confectus
Scilla maritima	Scilla	Scilla	Squilla
———— exsiccata	Scillæ pulvis		Scilla præparata
———— acetum	—— acetum	Acetum scillæ	Acetum scilliticum
———— syrupus	—— oxymel	Oxymel scillæ	Oxymel scilliticum
	—— tinctura	Tinctura scillæ	Essentia squillæ
Pilulæ scilliticæ	—— cum zingibere pilulæ	Pilulæ scillæ comp.	
Scrophularia nodosa	Scrophularia		
Sium nodiflorum	Sium		
Sinapis alba	Sinapi	Sinapis	Sinapis nigra
	—— cataplasma	Cataplasma sinapis	Sinapismus
Sisymbrium nasturtium			Nasturtium aquaticum
Smilax sarsaparilla	Sarsaparilla	Sarsaparilla	
———— decoctum	———— decoctum	Decoctum sarsaparillæ	
	———————— compositum	———————— compositum	
		Extractum sarsaparillæ	
Sodæ carbonas impurus	Barilla, soda impura	Soda impura	Natron impurum
—— carbonas	Sodæ carbonas	Sodæ subcarbonas	Sal sodæ. Alcali minerale aëratum
	———— siccatum	—— subcarbonas exsiccata	
—— super carbonatis aqua		—— carbonas	
—— phosphas	—— phosphas		
—— sulphas	—— sulphas	—— sulphas	Sal catharticus Glauberi
—— murias	Sal commune; murias sodæ	—— murias	Muria; sal commune
	Murias sodæ siccatum		

Edinburgh.	*Dublin.*	*London.*	*Various.*
Sodæ boras	Borax, sub-boras sodæ	Sodæ boras	Sub-boras sodæ. *Lond. syn.*
		Mel boracis	
Solanum dulcamara	Dulcamara	Dulcamara	Solanum scandens
		Decoctum dulcamaræ	
Solidago virga aurea	Virga aurea		
Spartium scoparium	Genista	Spartium	
	——— extractum		
Spigelia Marilandica	Spigelia	Spigelia	
Spermaceti	Sperma ceti	Cetaceum	Physeter macrocephalus
	Spermatis ceti unguentum	Unguentum cetacei	Linimentum album
Ceratum simplex			Ceratum album
Spongia officinalis	Spongia	Spongia	
	——— ustæ pulvis	——— usta	
Stannum	Stannum	Stannum	
	——— pulvis		
Styrax Benzoin ; Balsamum	Benzoe	Benzoinum	Assa dulcis
——— tinctura composita	——— tinctura composita	Tinctura benzoini composita.	Balsamum traumaticum
——— officinalis ; Balsamum	Styrax calamita	Styracis balsamum	
	——— purificata		
Succinum	Succinum	Succinum	Electrum, carabe
——— oleum	——— oleum	Oleum succini	
——— purissimum	——— rectificatum		
Sulphur		Sulphur	
Sulphur sublimatum	Sulphur sublimatum	——— sublimatum	
——— lotum	——— lotum	——— lotum	
		——— præcipitatum	
——— unguentum	——— unguentum	Sulphuris unguentum	Unguentum antipsoricum
		——— composit.	
Sus scrofa, adeps	Adeps suillus	Adeps	
	——— præparatus	——— præparata	

Edinburgh.	*Dublin.*	*London.*	*Various.*
Swietenia febrifuga	Swietenia febrifuga		
——— mahagoni			
Tamarindus Indica	Tamarindus	Tamarindus	
——— infusum, cum senna	Infusum sennæ cum tamarindis		
Tanacetum vulgare	Tanacetum		
Teucrium chamædrys	Chamædrys		
Teucrium marum	Marum syriacum		
Toluifera balsamum; Balsamum	Balsamum Tolutanum	Balsamum Tolutanum	Balsamum de Carthagena
——— tinctura	——— tinctura		
——— syrupus		Syrupus Tolutanus	Syrupus balsamicus
Tormentilla erecta	Tormentilla	Tormentilla	Tormentilla officinalis. *Lond.*
Triticum hybernum			
Amylum	Amylum	Amylum	
Mucilago amyli	Mucilago amyli	Mucilago amyli	
Trochisci gummosi			Troschisci bechici albi
		Farina	
Tussilago farfara	Tussilago	Tussilago	
Valeriana officinalis	Valeriana	Valeriana	
	——— tinctura	Tinctura valeriana	
	——— ammoniata	——— ammoniata	Tinctura valerianæ volat.
	——— extractum		
	——— infusum		
Veratrum album	Helleborus albus	Veratrum	
		Decoctum veratri	
	——— unguentum	Veratri unguentum	
——— tinctura			
Veronica beccabunga	Beccabunga		
Vinum album Hispanum		Vinum (sherry)	

Edinburgh.	*Dublin.*	*London.*	*Various.*
Viola odorata	Viola	Viola	Viola martialis
——— syrupus	——— syrupus		
Vitis vinifera	Uvæ passæ sole siccatæ	Uvæ passæ	
Ulmus campestris	Ulmus	Ulmus	
	——— decoctum	Decoctum ulmi	
Wintera aromatica			Winteranus cortex
Zincum	Zincum	Zincum	
——— oxidum	Oxydum zinci	Zinci oxydum	Flores zinci
——— unguentum	——— unguentum	Zinci unguentum	
——— oxidum impurum	Tutia		
——— oxidum imp. præparatum			
——— unguentum	Unguentum tutiæ		
——— carbonas impurus	Calaminaris	Calamina	Cadmia fossilis
——— præparatus	Lapis calaminaris præparatus	——— præparata	
——— ceratum	——— unguentum	Ceratum calaminæ	Ceratum epuloticum
——— sulphas	Sulphas zinci	Zinci sulphas	Sal vitrioli ; Chalcanthum album
——— solutio			Aqua vitriolica
——— acetitis solutio	Tinctura acetatis zinci		

Note.---The articles in italics in the first column are the scientific names of articles not in the Edinburgh Pharmacopœia.

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